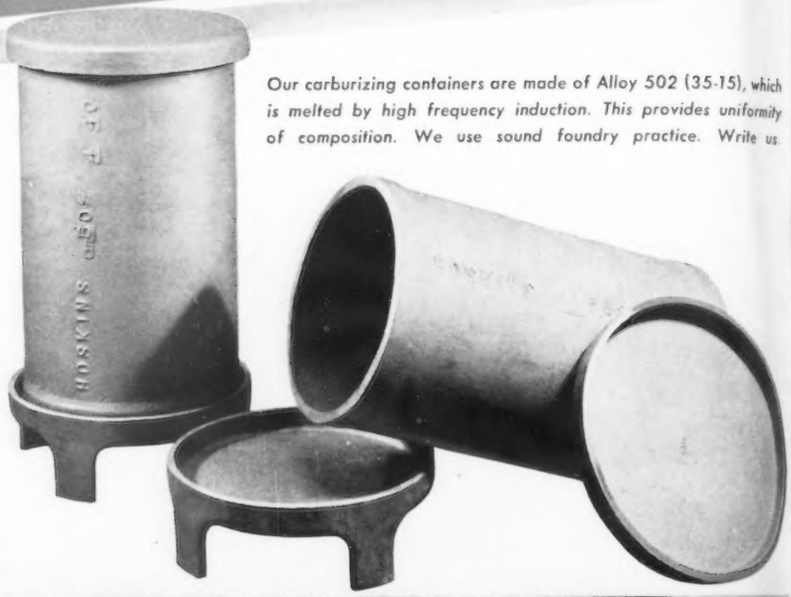
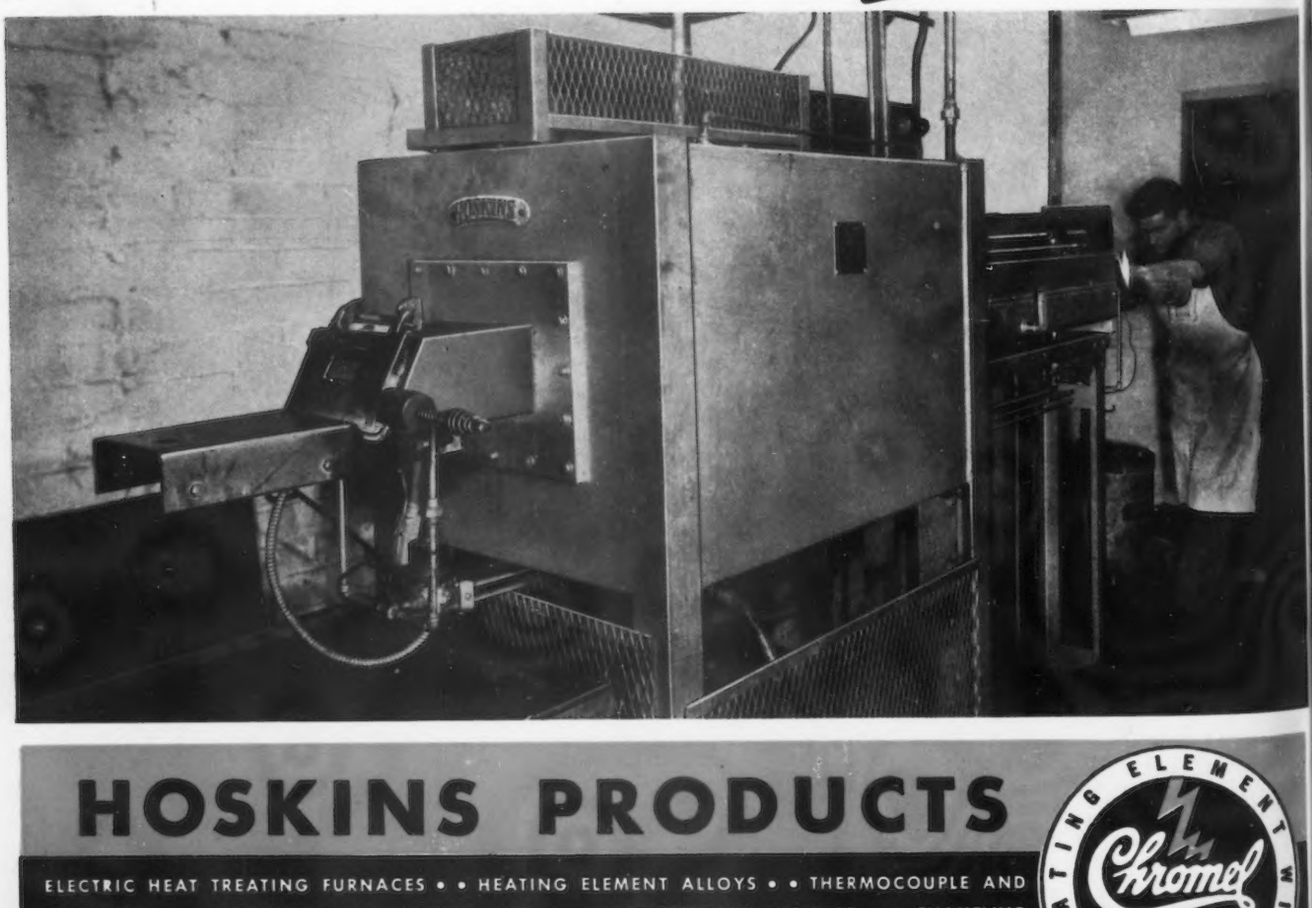
IRON AGE
INLAND
STEEL
TODAY-for men who fight
TOMORROW-for men who build
ARMY
E
NAVY
INLAND STEEL CO.
CHICAGO

If You Do Brazing or Carburizing

The Hoskins Hydrogen Brazing Furnace handles light parts, and is small and compact. Its heating chamber is 6½" wide x 5", or less, high; the length is whatever is needed. The work is ordinarily pushed through manually, but a conveyor (which we don't supply) can be adapted. The furnace has a fast recovery rate and gives good production. The hydrogen consumption is economical, its flow being automatically rated by solenoid valves. If you do light brazing, this Hoskins Furnace will do a good job for you. . . . Hoskins Manufacturing Co., Detroit Michigan.



Our carburizing containers are made of Alloy 502 (35-15), which is melted by high frequency induction. This provides uniformity of composition. We use sound foundry practice. Write us.



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ELECTRIC HEAT TREATING FURNACES • • HEATING ELEMENT ALLOYS • • THERMOCOUPLE AND LEAD WIRE • • PYROMETERS • • WELDING WIRE • • HEAT RESISTANT CASTINGS • • ENAMELING FIXTURES • • SPARK PLUG ELECTRODE WIRE • • SPECIAL ALLOYS OF NICKEL • • PROTECTION TUBES

HEATING ELEMENT WIRE — Chromel — NICKEL-CHROMIUM

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 151, No. 12.

MARCH 25, 1943
VOL. 151, NO. 12

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Member, Audit Bureau of Circulations
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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single Copy, 35 cents, Annual Number, $2
Cable Address "Ironage N. Y."

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Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Sts.
Philadelphia, Pa.
U.S.A.

Editorial and Advertising Offices
100 East 42nd St.
New York, N. Y.
U.S.A.

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RYERSON *Immediate* STEEL

United States Troops Advancing on Oran. Photo by U. S. Army Signal Corps.

Helps Make Record Delivery to *AFRICAN FRONT*

BACKING up our fast-moving mechanized Army takes fast-moving production—swift action that starts the minute the order is given, that never sleeps, and that turns out jobs in days, which normally would take weeks to do.

Certain equipment already ashore in North Africa required important alterations to meet unusual battle conditions. The North Africa command said: "RUSH"! The Ordnance Department said: "RUSH"! The Ryerson customer who got the order said: "RUSH"! —and fifty tons of steel were immediately forthcoming from a nearby Ryerson stock.

Result: Delivery to the Army in *one week* of equipment which normally would have taken many weeks to produce. An Army-Navy "E" Award to the manufacturer and a warm letter of thanks to Ryerson.

An unusual case? Somewhat—but typical of hundreds in which Ryerson stocks and Ryerson service have helped get war equipment started *faster*—on their way *sooner* to our fighting men.

In all probability, Ryerson Steel-Service can assist you on your rush war production contracts, if "spot" steel is required. One of the ten strategically-located Ryerson plants is nearby. Phone, wire or write; you'll receive quick personal cooperation!

JOSEPH T. RYERSON & SON, *Inc.*

CHICAGO · MILWAUKEE · ST. LOUIS · CINCINNATI · DETROIT
CLEVELAND · BUFFALO · BOSTON · PHILADELPHIA · JERSEY CITY

RYERSON STEEL-SERVICE

THE IRON AGE

MARCH 25, 1943

ESTABLISHED 1855

Advertising in Overalls

I HAVE been reading various industrial publications for a good many years and during this time the advertising pages have come in for their share of my attention. I think that they do too with most readers.

If, on the basis of this experience, I were asked to put the finger on the principal factor constituting good industrial advertising, I would unhesitatingly say that it was helpfulness.

Some publications are read for amusement, but the man or woman who subscribes to an industrial publication has literally hung out a "help wanted" sign. He wants help to meet his present-day problems or to prepare to meet those of tomorrow. And he wants that help shaped to suit the existing or the about to exist conditions of his industry.

When industrial advertising is so shaped as to be both helpful and timely, it is good advertising. And you can judge editorial quality also by the same tape measure.

Previous to the war and in the days when there were no restrictions on selling or buying of industrial equipment, materials or services, the advertising pages of industrial journals were useful directories which told of the availability and capability of products. Works managers, production engineers and others found it as necessary in their professions to familiarize themselves with what was to be had by reading these pages as lawyers find it necessary to follow the endless stream of legal decision and precedent. I think it can safely be said that there is scarcely a plant in this country whose equipment, in large part, does not bear testimony to the influence of industrial advertising. It has been helpful and timely.

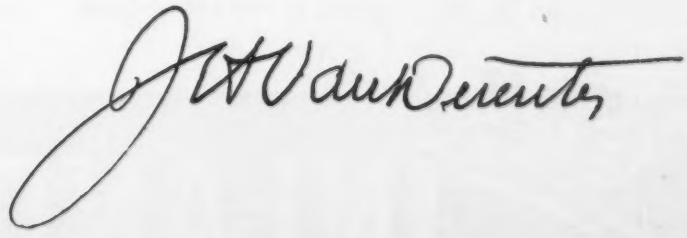
Today the conditions have changed, and the advertising page has another job to do. It cannot tell you what you can buy because that function has passed out of the hands of both buyers and sellers. But it can and does tell you how to make better use of what you have got or are permitted to get.

Look through the advertising pages of our leading industrial journals and you will find a wealth of information in any issue, practical information about increasing production, or cutting down waste. It's what I call "brass tack" advertising.

Industrial advertisers are living up to their responsibilities of today. But how about you readers of today's industrial advertising?

Yesterday, the advertising message stopped with you. You were the ones who chose the equipment. Today, to make it fully effective, you must pass it down the line to those who operate it. You must see that the suggestions made in this "brass tack" advertising are carried down the line, and put to work.

Today, advertising is putting on overalls, and you must, too.



How to Cut Replacement Costs

and Send More Steel to War

Regular inspections, adequate painting, and frequent lubrication, will cut replacement costs and save steel that is vitally needed in every quarter of the globe by America and her Allies.

Initiate, today, a special wartime inspection service. Examine roofs, siding, and structural members of buildings—especially where atmospheric conditions, or process fumes, result in destructive corrosion. Clean and paint steel that shows signs of deterioration. Consult a reliable paint manufacturer if standard paints do not prove satisfactory.

Many types of manufacturing equipment—trucks, cranes, and the like—operate in and out of doors. Such equipment should not only be painted, but moving parts should be adequately lubricated to save the steel that otherwise would be needed for replacement of parts.

The moving parts of all types of machinery should be regularly inspected to make certain that operators are applying lubricating oils and greases of the correct qualities, and in the right quantities. If undue wear of moving parts continues, ask a lubricant manufacturer for advice.

Take better care of the steel now serving you. Less steel used for replacement means more steel for the fighting fronts.

ARMY E NAVY

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas Cit

Effect of Boron Containing Additions on NE STEEL

. . . Using an addition agent containing 0.5 per cent boron in NE-9420 and NE-9440 alloy steels, it is shown that the most important effect is to increase hardenability, the effect for low carbon steel being less than for the medium carbon steel. Other articles on boron have appeared in the Nov. 19, 1942, and Feb. 4, 1943, issues.

o o o

By A. S. JAMESON
Works Metallurgist, International Harvester Co., Chicago

o o o

INGOTS from 100-ton open hearth heats of NE-9420 and 9440 were treated with a 3.6 lb. per ton addition agent of the following percentage composition:

Titanium	20.0
Aluminum	13.0
Manganese	8.0
Zirconium	4.0
Boron	0.5

The NE-9420 heat was of the following analysis: 0.23 C, 0.96 Mn, 0.55 Si, 0.36 Ni, 0.23 Cr, 0.12 Mo, and sulphur and phosphorus under 0.025 per cent.

This heat had an austenitic grain size of No. 7 after carburizing at 1700 deg. F. for 8 hr. and slow cooling. Specimens for physical tests were obtained by forging 3⅞ x 3⅞ in. billets to 1⅛-in. rounds. These 1⅛-in. rounds were annealed at 1650 deg. F.

TABLE I
Impact, Hardness and Fractured Grain Size

Treatment	Energy Absorbed Ft.-Lb.	Hardness R"C" Case	Hardness R"C" Core	Fractured Grain Size	Case Depth, In.	Energy Absorbed Ft.-Lb.	Hardness R"C" Case	Hardness R"C" Core	Fractured Grain Size	Case Depth, In.
Box cooled. Heated to 1575 deg. F. and quenched in oil; reheated to 1525 deg. F. and quenched in oil; tempered at 325 deg. F.	6	62	30	8.0	0.051	11	63	47	8.5	0.047
Box quench in oil; tempered at 325 deg. F.	5	63	31	8.5	0.047	8	63	45	8.0	0.043
Box quenched in oil; reheated to 1525 deg. F. and quenched in oil; tempered at 325 deg. F.	6	63	33	8.5	0.047	9	63	45	8.0	0.047

TABLE II
Tensile Tests of $1\frac{5}{16}$-In. Rounds

	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent in 2 In.	Reduction of Area Per Cent	Hardness R"C"	Hardness Brinell
Untreated	94,900	127,500	18.5	47.2	22	240
Treated	99,000	139,000	19.5	40.0	25	255

Tensile properties

The tensile properties were obtained by quenching ASTM test bars of 0.525-in. diameter in water from 1450 to 1650 deg. F. at 50 deg. F. intervals and tempering at 325 deg. F. for 1 hr.

The specimens were ground to 0.5-in. diameter after heat treatment.

The results of the tensile tests are shown in Figs. 1 and 2. The treated material shows a higher yield point to tensile strength ratio with a higher reduction of area value.

Hardenability

The hardenability was determined by end-quench tests.

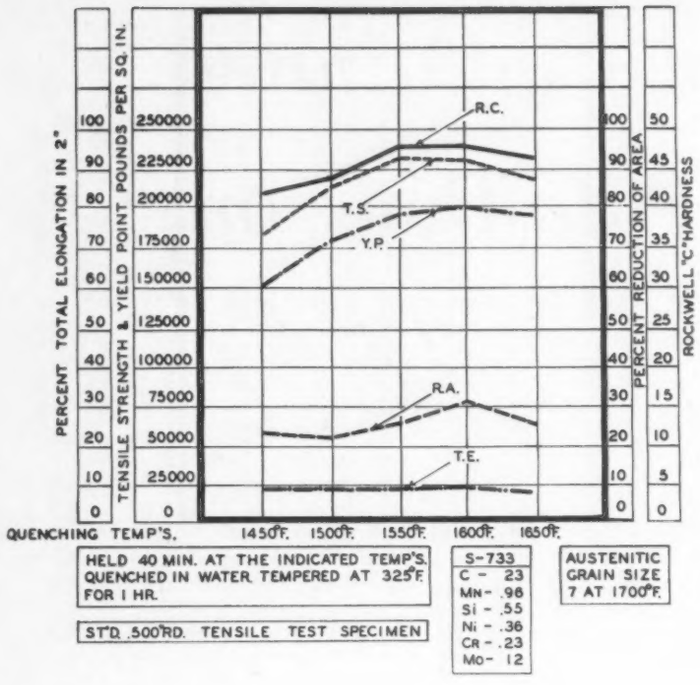
A 1-in. round by 3-in. long specimen was end-quenched in water from 1650 deg. F. The specimen had been previously normalized (air cooled) from 1650 deg. F.

The hardenability curves are shown in Fig. 3. The hardenability (J-32) value is 1/16-⅛ in. greater for the treated steel.

Carburizing tests

Carbon determinations at intervals of 0.005 in. were taken from 1-in. cylinders carburized at 1700 deg. F.

N. E. Steel



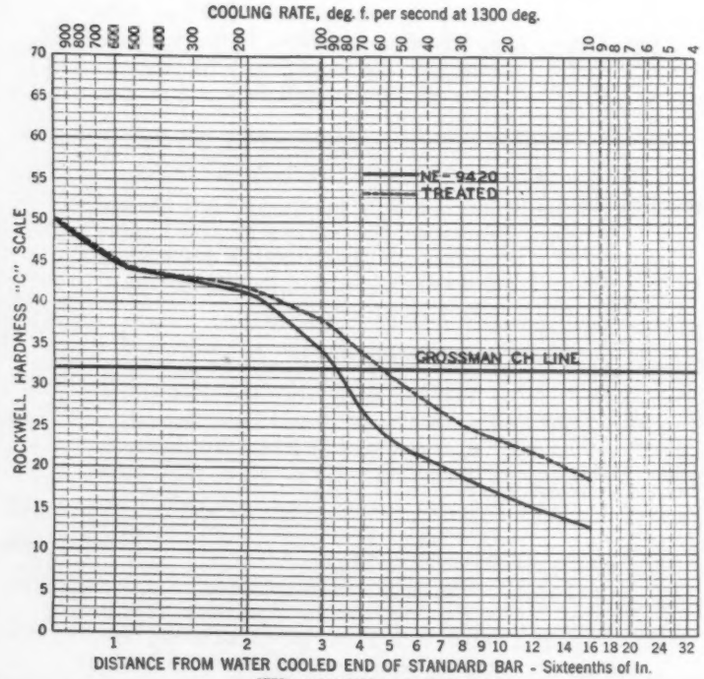
ABOVE

Fig. 1—Tensile properties of AISI NE-9420 steel.

o o o

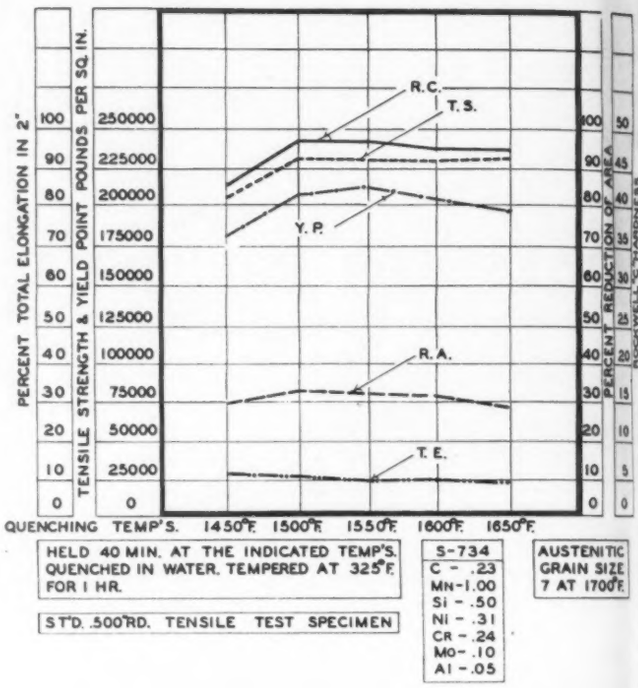
BELOW

FIG. 3—Hardenability curves for NE-9420 steel, treated and untreated.


COOLING RATE, deg. f. per second at 1300 deg.
ROCKWELL HARDNESS "C" SCALE
NE-9420
TREATED
GROSSMAN CH LINE
DISTANCE FROM WATER COOLED END OF STANDARD BAR - Sixteenths of In.

STEEL ANALYSES AND QUENCHES

Steel	C	Mn	P	S	Si	Ni	Cr	Mo		Quenching Temperature	Grain Size	Heat Number
NE-9420	.23	.96	.014	.022	.55	.36	.23	.12		1650°F.	7	
TREATED	.23	1.00	.012	.024	.50	.31	.24	.10		1650°F.	7	



ABOVE

Fig. 2—Tensile properties of AISI NE-9420 treated steel.

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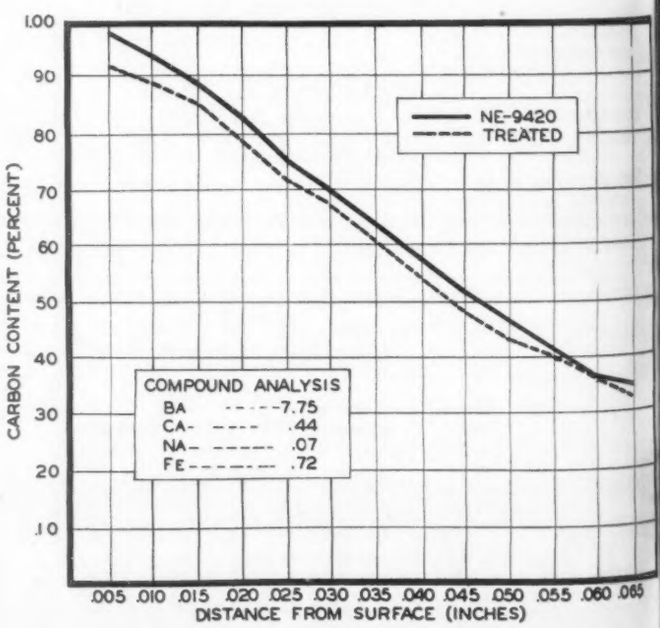
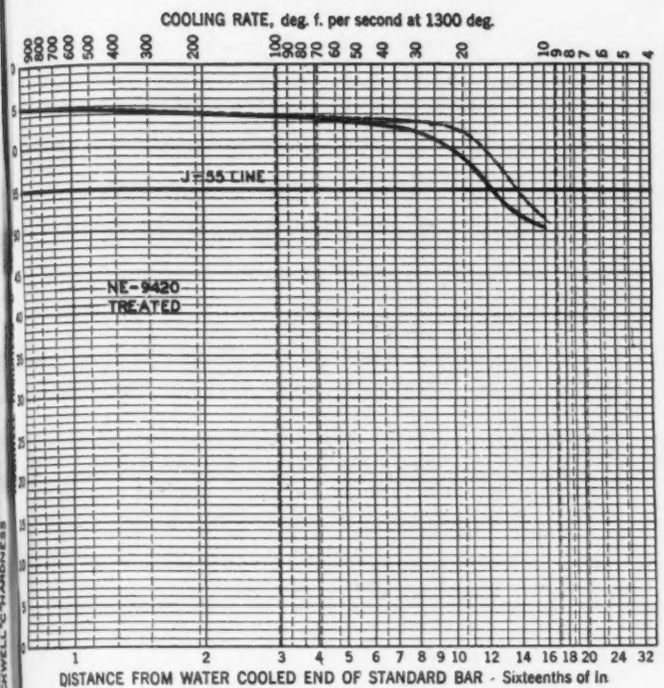
BELOW

FIG. 4—Carbon gradients of carburized AISI NE-9420 steel. One-inch cylinders carburized at 1700 deg. F. for 8 hr. and slowly cooled.




COOLING RATE, deg. f. per second at 1300 deg.
J=55 LINE
NE-9420
TREATED
DISTANCE FROM WATER COOLED END OF STANDARD BAR - Sixteenths of In.

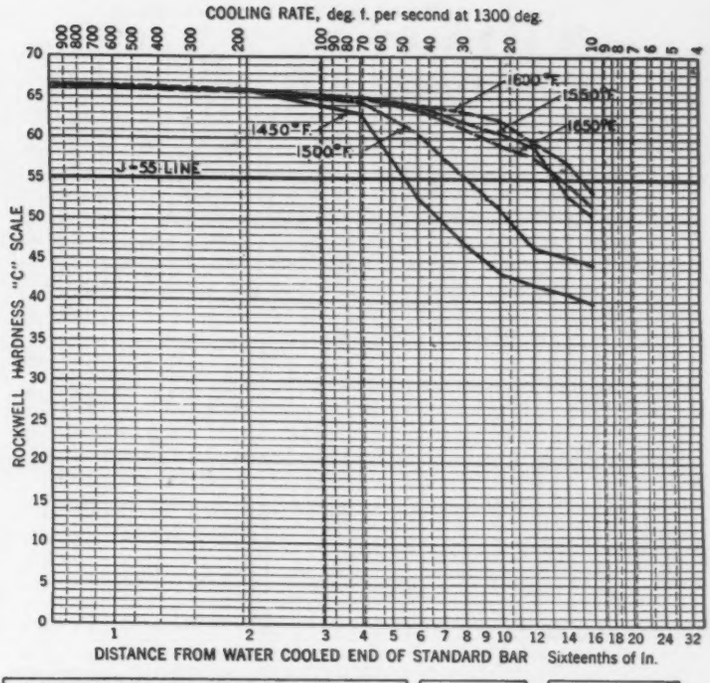
STEEL ANALYSES AND QUENCHES

Steel	C	Mn	P	S	Si	Ni	Cr	Mo		Quenching Temperature	Grain Size	Heat Number
NE-9420	.23	.96	.014	.022	.55	.36	.23	.12		1700°F	7	
TREATED	.23	1.00	.012	.024	.50	.31	.24	.10		1700°F	7	

ABOVE

FIG. 5—End-quench hardenability of standard specimens carburized for 8 hr. at 1700 deg. F. and end-quenched in water.

o o o



CARBURIZED AT 1700°F. FOR 8 HOURS AND QUENCHED IN OIL. REHEATED TO INDICATED TEMPERATURES. HELD AT HEAT FOR 35 MIN. AND END QUENCHED IN WATER

1" RD. X 3" SPECIMEN

S-733
C - .23
MN - 96
SI - 55
Ni - 36
CR - 23
MO - 12

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

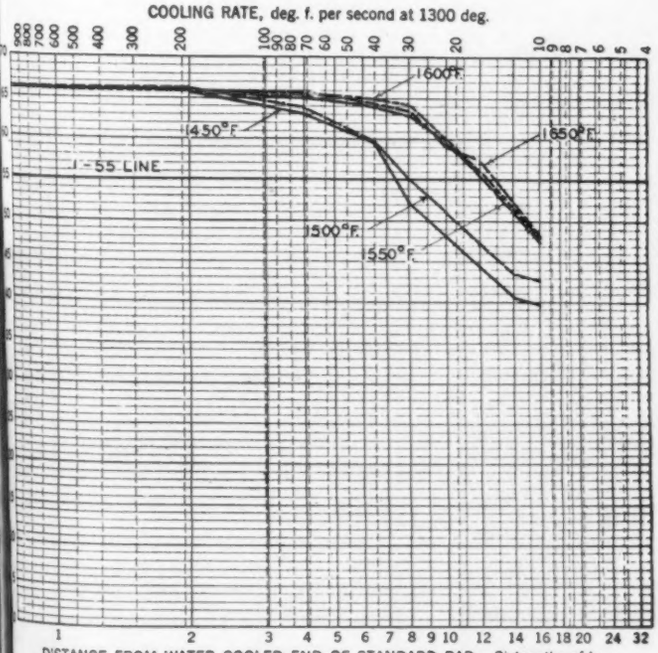
ABOVE

FIG. 6—Effect of temperature on hardenability of AISI NE-9420 steel.

o o o

BELOW

FIG. 7—Effect of temperature on hardenability of AISI NE-9420 treated steel.



URIZED AT 1700°F. HELD AT HEAT 8 HRS. AND QUENCHED IN OIL. EATED TO INDICATED TEMPER-RES. HELD AT HEAT FOR 35 MIN. END QUENCHED IN WATER.

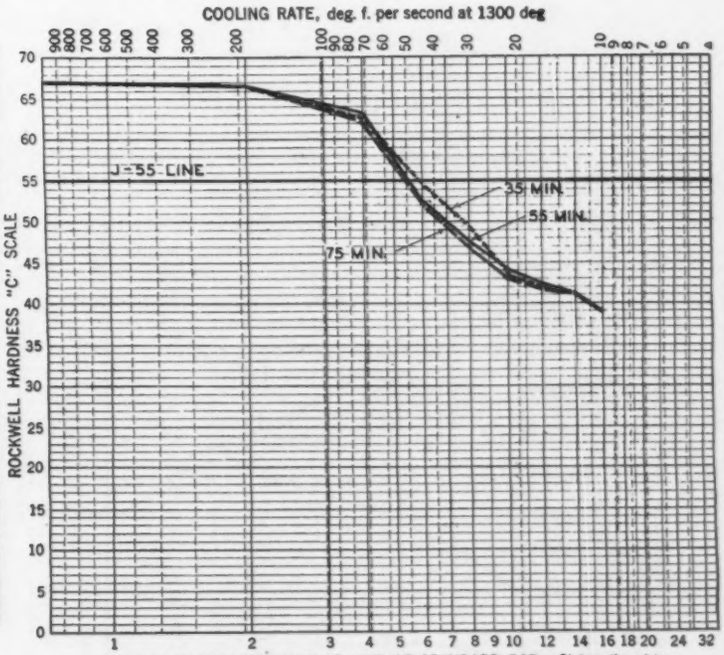
1" RD. X 3" SPECIMEN

S-734
C - .23
MN-1.00
SI - .50
NI - .31
CR - .24
MO - .10
AI - .05

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

BELOW

FIG. 8—Effect of holding time on the hardenability of AISI NE-9420 steel.

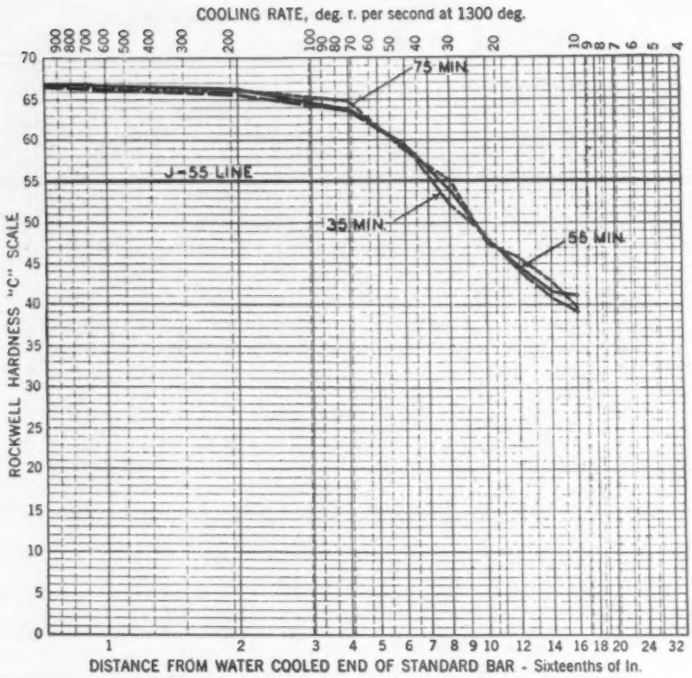

COOLING RATE, deg. f. per second at 1300 deg
J=55 LINE
35 MIN.
55 MIN.
75 MIN.
ROCKWELL HARDNESS "C" SCALE
DISTANCE FROM WATER COOLED END OF STANDARD BAR Sixteenths of In

CARBURIZED AT 1700°F FOR 8 HOURS AND QUENCHED IN OIL. REHEATED TO 1450°F. HELD AT THE INDICATED TIME AND END QUENCHED IN WATER.

1"RD. X 3" SPECIMEN

S-733
C - .23
MN - .96
SI - .55
Ni - 36
CR - .23
MO - 12

AUSTENITIC GRAIN SIZE 7 AT 1700°F


COOLING RATE, deg. r. per second at 1300 deg.
900 800 700 600 500 400 300 200 100 90 80 70 60 50 40 30 20 10 9 8 7 6 5 4
ROCKWELL HARDNESS "C" SCALE
70 65 60 55 50 45 40 35 30 25 20 15 10 5 0
75 MIN.
J-55 LINE
35 MIN.
55 MIN.
1 2 3 4 5 6 7 8 9 10 12 14 16 18 20 24 32
DISTANCE FROM WATER COOLED END OF STANDARD BAR - Sixteenths of In.

CARBURIZED AT 1700°F. FOR 8 HOURS AND QUENCHED IN OIL. REHEATED TO 1450°F. HELD AT THE INDICATED TIME AND END QUENCHED IN WATER.

1" RD. X 3" SPECIMEN

S-734
C - .23
MN- 1.00
SI - .50
Ni - 31
CR - .24
MO- .10
Al - .05

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

ABOVE

FIG. 9—Effect of holding time on the hardenability of AISI NE-9420 treated steel.

o o o

BELOW

FIG. 10—Impact and hardenability specimen for carburized steels, type "B."

o o o

for 8 hr. and slowly cooled. These determinations are shown in Fig. 4.

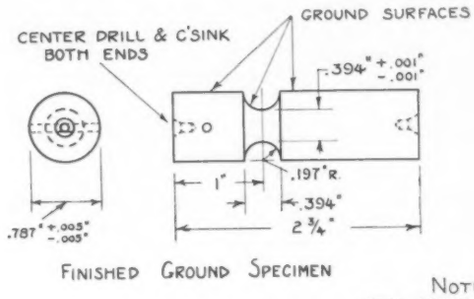
The composition of the compound was barium 7.8 per cent, calcium 0.44 per cent, sodium 0.07 per cent and iron 0.72 per cent.

Hardenability—carburized

The end-quench hardenability of standard specimens carburized for 8 hr. at 1700 deg. F. and end-quenched in water is illustrated in Fig. 5. Again the hardenability of the treated steel is higher.

The hardenability of end-quench specimens carburized at 1700 deg. F. for 8 hr. quenched in oil and reheated from 1450 to 1650 deg. F. at 50 deg. intervals and end-quenched in water is shown in Figs. 6 and 7.

These data are also supplemented with data for different holding times



FINISHED GROUND SPECIMEN

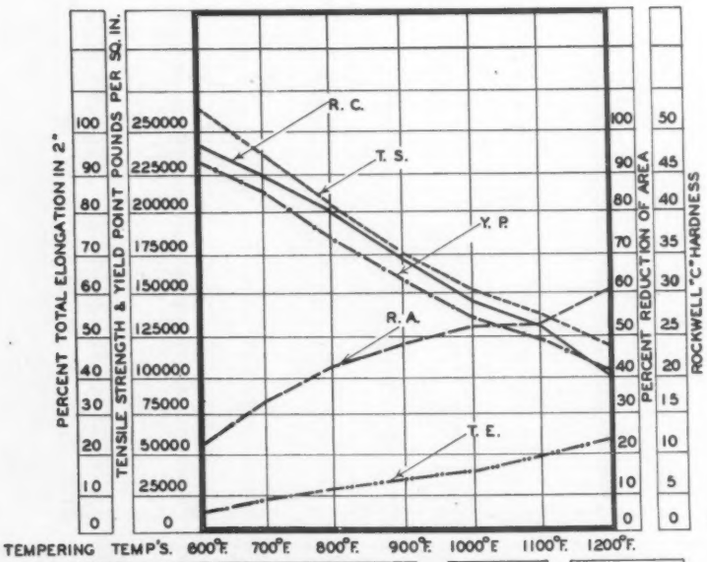
NOTE.
GRIND GROOVE WITH A RADIAC 9A-150I GRINDING WHEEL
GRIND .787 DIAM. WITH A NORTON 60 M GRINDING WHEEL

CM.	DECIMALS
1	.3937
2	.7874
3	1.1811
4	1.5748
5	1.9685
6	2.3622
7	2.7559

o o o

BELOW

FIG. 11—Tensile properties of AISI NE-9440 steel.


PERCENT TOTAL ELONGATION IN 2"
TENSILE STRENGTH & YIELD POINT POUNDS PER SQ. IN.
PERCENT REDUCTION OF AREA
ROCKWELL "C" HARDNESS
R. C.
T. S.
Y. P.
R. A.
T. E.
TEMPERING TEMP'S. 600°F. 700°F. 800°F. 900°F. 1000°F. 1100°F. 1200°F.

HELD 40 MIN. AT 1550°F. & QUENCHED IN OIL. TEMPERED AT THE INDICATED TEMPERATURES.

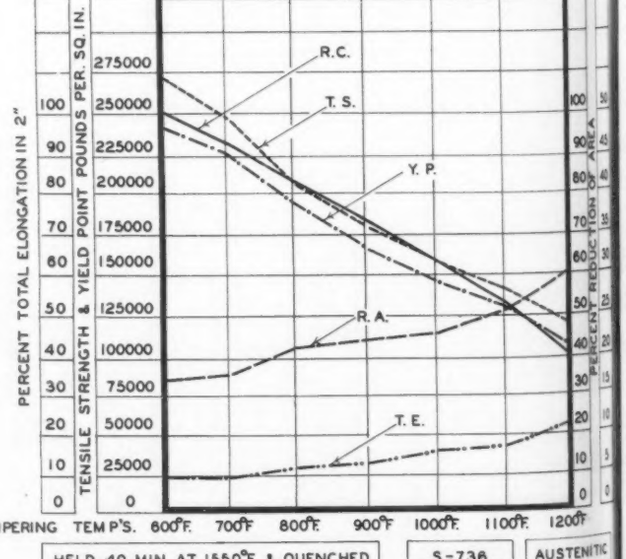
ST'D. .500" RD. TENSILE TEST SPECIMEN

S-735
C - .42
MN- 1.14
SI - 53
NI - .29
CR - 33
MO - .10

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

BELOW

FIG. 12—Tensile properties of AISI NE-9440 treated steel.

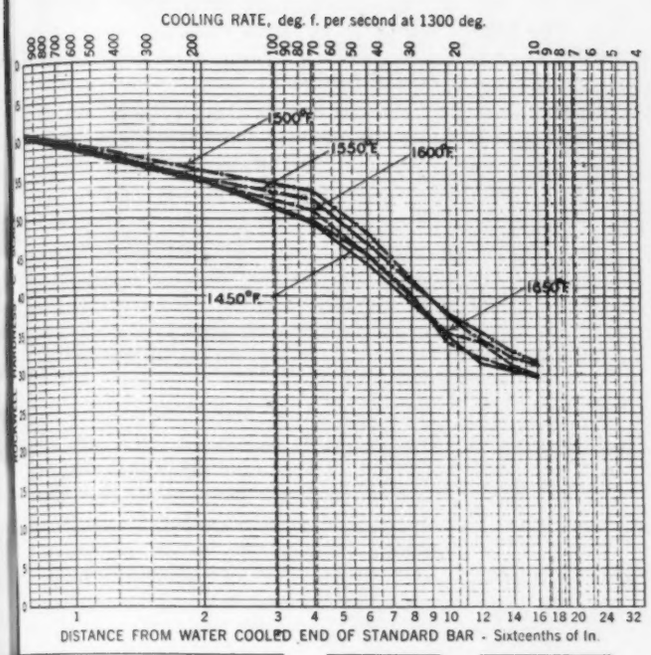

PERCENT TOTAL ELONGATION IN 2"
TENSILE STRENGTH & YIELD POINT POUNDS PER SQ. IN.
PERCENT REDUCTION OF AREA
R. C.
T. S.
Y. P.
R. A.
T. E.
TEMPERING TEMP'S. 600°F. 700°F. 800°F. 900°F. 1000°F. 1100°F. 1200°F.

HELD 40 MIN. AT 1550°F. & QUENCHED IN OIL. TEMPERED AT THE INDICATED TEMPERATURES.

ST'D. .500" RD. TENSILE TEST SPECIMEN

S-736
C - .44
MN- 1.02
SI - .49
NI - .27
CR .38
MO - .13
Al - .056

AUSTENITIC GRAIN SIZE 7 AT 1700°F.



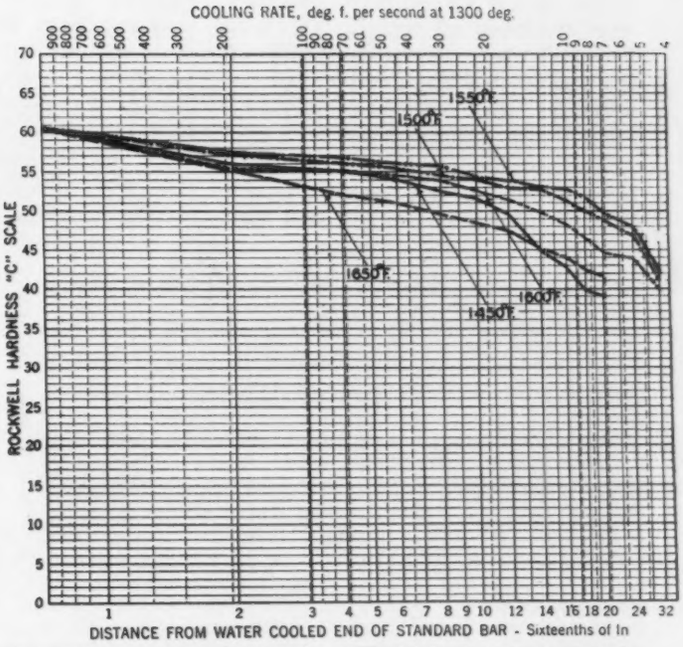
RMALIZED AT 1650°F. HEATED
INDICATED TEMPERATURES
D AT HEAT FOR 35 MIN. &
QUENCHED IN WATER.

1" RD. X 3" SPECIMEN

S-735
C - .42
MN- 1.14
SI - .53
NI - .29
CR - .33
MO - .10

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

FIG. 13—Effect of temperature on hardenability of AISI NE-9440 steel.



NORMALIZED AT 1650°F. HEATED TO INDICATED TEMPERATURES HELD AT HEAT FOR 35 MIN. & END QUENCHED IN WATER.

1 RD. X 3 SPECIMEN

S-736
C - .44
MN - 1.02
SI - .49
NI - .27
CR - .38
MO - .13
AI - .056

AUSTENITIC GRAIN SIZE 7 AT 1700°F.

FIG. 14—Effect of temperature on hardenability of AISI NE-9440 treated steel.

when quenched from 1450 deg. F. (See Figs. 8 and 9.) Assuming a reheating temperature of 1500 deg. F. the treated steel has about 1/16 in. greater J-55 hardenability, but at 1550 deg. F. there is very little difference.

The holding time within reasonable limits does not seem to have any effect on the hardenability rating.

Carburized impact tests

Impact values obtained from a specimen shown in Fig. 10 are given in Table I. This specimen is carburized at 1700 deg. F. for a case depth of from 0.040-0.050 in. and given three different heat treatments. Information is obtained as to surface hardness, core hardness and fractured case grain size, as well as impact values.

It cannot be said that the significance of the impact values has been definitely proved at the present time, so that conclusions arrived at from the foot-pound values should be used with caution.

The treated and untreated steels have the same surface hardness and fractured grain size. The impact values for the treated steel are slightly higher. The core hardness of the treated steel specimens was considerably higher than the untreated steel.

The NE-9440 Experiments

The NE-9440 heat analyzed 0.44 C, 1.02 Mn, 0.49 Si, 0.38 Ni, 0.27 Cr, and 0.13 Mo.

The austenitic grain size of the heat was ASTM No. 7 after carburizing at 1700 deg. F. for 8 hr. and slow cooling.

Tensile tests of 1 5/16-in. hot rolled rounds of the treated and untreated steel had the physical properties shown in Table II.

TABLE III
Increase in Hardenability in Terms of Cylindrical Bars Total Quenched

		UNTREATED				TREATED			
				Approximate Maximum Bar Size in Which 32 R"C" is Obtainable at Center				Approximate Maximum Bar Size in Which 32 R"C" is Obtainable at Center	
Analysis	Condition	Value	Cooling Rate, Deg. Per Sec. at 1300 Deg. F.	Oil	Water	Value	Cooling Rate, Deg. Per Sec. at 1300 Deg. F.	Oil	Water
NE-9420	Uncarburized	J32 —3	90	½	1⅜	J32 —5	60	⅝	1¼
	Carburized at 1700 deg. F. and direct quenched	J55 —12	18			J55 —14	12		
	Carburized, quenched and reheated to 1500 deg. F.	J55 —8	30			J55 —8	30		
				Approximate Maximum Bar Size in Which 50 R"C" is Obtainable at Center				Approximate Maximum Bar Size in Which 50 R"C" is Obtainable at Center	
				Oil	Water			Oil	Water
NE-9440	Quenched from 1550 deg. F.	J50 —5	60	⅝	1¼	J50 —19	8	3	4

The ASTM 0.5 standard test bars were machined off center. This test indicated that the hardenability of the treated steel was greater than the untreated steel, assuming the same cooling rate after rolling.

The tensile properties of the treated and untreated steel obtained from quenching 0.525-in. ASTM test bars in oil from 1550 deg. F. are shown in Figs. 11 and 12. The bars were obtained from 3⅞ x 3⅞-in. billets forged to 1⅛-in. round and annealed. The test bars were machined from the center of the forged round.

As in the case of the NE-9420 steel, there is some indication that the treated steel has a higher yield point to tensile strength ratio with a higher reduction of area values.

Hardenability

End-quench hardenability of standard specimens quenched from temperatures of 1450 to 1650 deg. F. at 50 deg. F. intervals is shown in Figs. 13 and 14 for the treated and untreated steel. The special addition has a very marked effect in increasing the hardenability of NE-9440; the increase being much greater than is obtained by the same addition to NE-9420.

The effect of the holding time at 1550 deg. F. is shown in Figs. 15 and 16. The holding time within reasonable limit does not affect the hardenability of NE-9440.

To conclude, the most important effect of the addition agent was to increase the hardenability of the steels. The effect for the low carbon steel is less than for the medium carbon steel.

The increase in hardenability in terms of cylindrical bars total quenched is given in Table III.

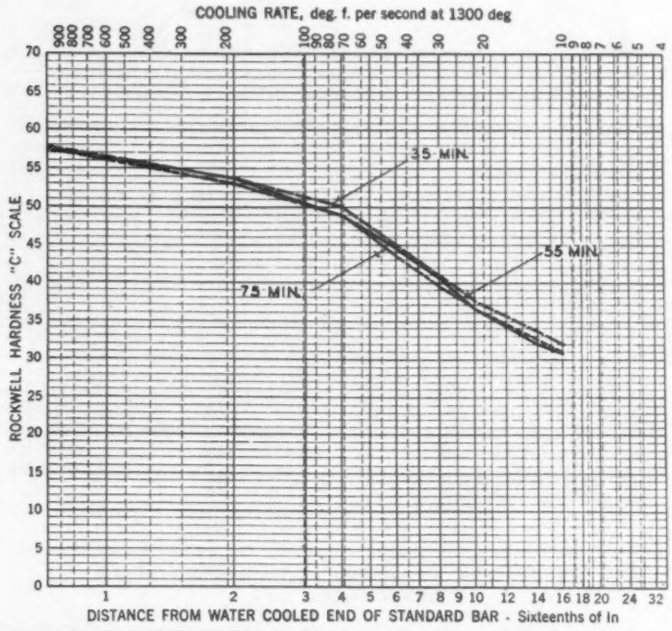

COOLING RATE, deg. f. per second at 1300 deg
ROCKWELL HARDNESS "C" SCALE
35 MIN.
55 MIN.
75 MIN.
DISTANCE FROM WATER COOLED END OF STANDARD BAR - Sixteenths of In
NORMALIZED AT 1650°F. HEATED TO 1550°F. HELD AT HEAT FOR INDICATED TIME & END QUENCHED IN WATER.
1"RD. X 3"SPECIMEN
S-751
C - .39
MN-1.38
SI - .50
CR - .46
AUSTENITIC GRAIN SIZE 7 AT 1700°F.

FIG. 15—Effect of holding time on the hardenability of AISI NE-9640 steel.

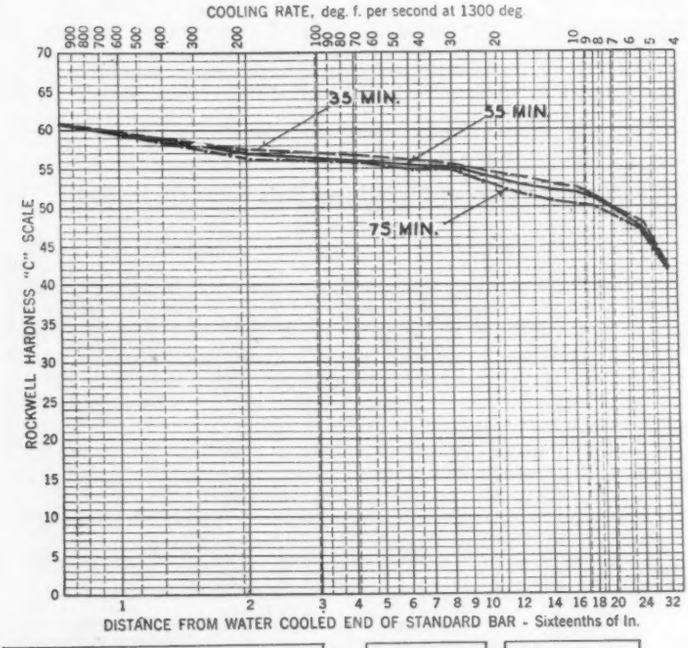
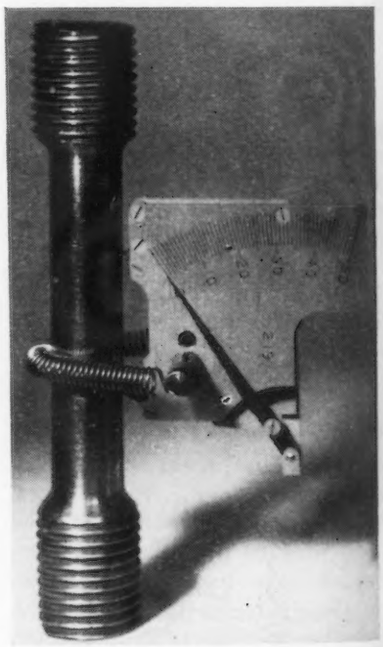

COOLING RATE, deg. f. per second at 1300 deg
ROCKWELL HARDNESS "C" SCALE
35 MIN.
55 MIN.
75 MIN.
DISTANCE FROM WATER COOLED END OF STANDARD BAR - Sixteenths of In.
NORMALIZED AT 1650°F. HEATED TO 1550°F. HELD AT HEAT FOR INDICATED TIME & END QUENCHED IN WATER.
1"RD. X 3" SPECIMEN
S-736
C - .44
MN-1.02
SI - .49
NI - .27
CR - .38
MO - .13
AL - .056
AUSTENITIC GRAIN SIZE 7 AT 1700°F.

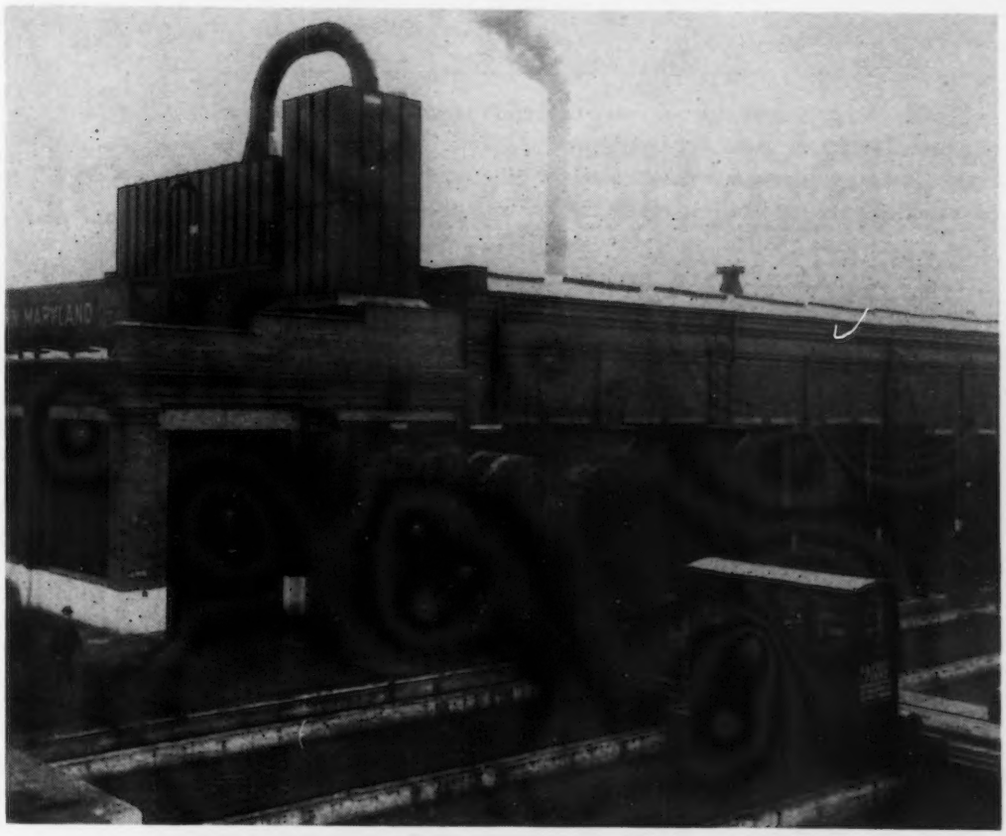
FIG. 16—Effect of holding time on the hardenability of AISI NE-9440 steel.



WEIGHING only 0.4 oz., the Porter-Lipp strain gage shown is rugged and accurate, yet quite inexpensive. Strain multiplication factor is approximately 300 and has a range of 0.008 in. or better. The instrument is graduated so that each division corresponds to a strain of approximately 0.0001 in. It has a readable accuracy of 0.00002 in. for a 1-in. gaged length. This testing gage is offered by the Baldwin Southwark Division of the Baldwin Locomotive Works, Philadelphia, to meet the demands of structural testing work in connection with the specialized needs of the present emergency.

Blast Cleaning Locomotives and Bombs

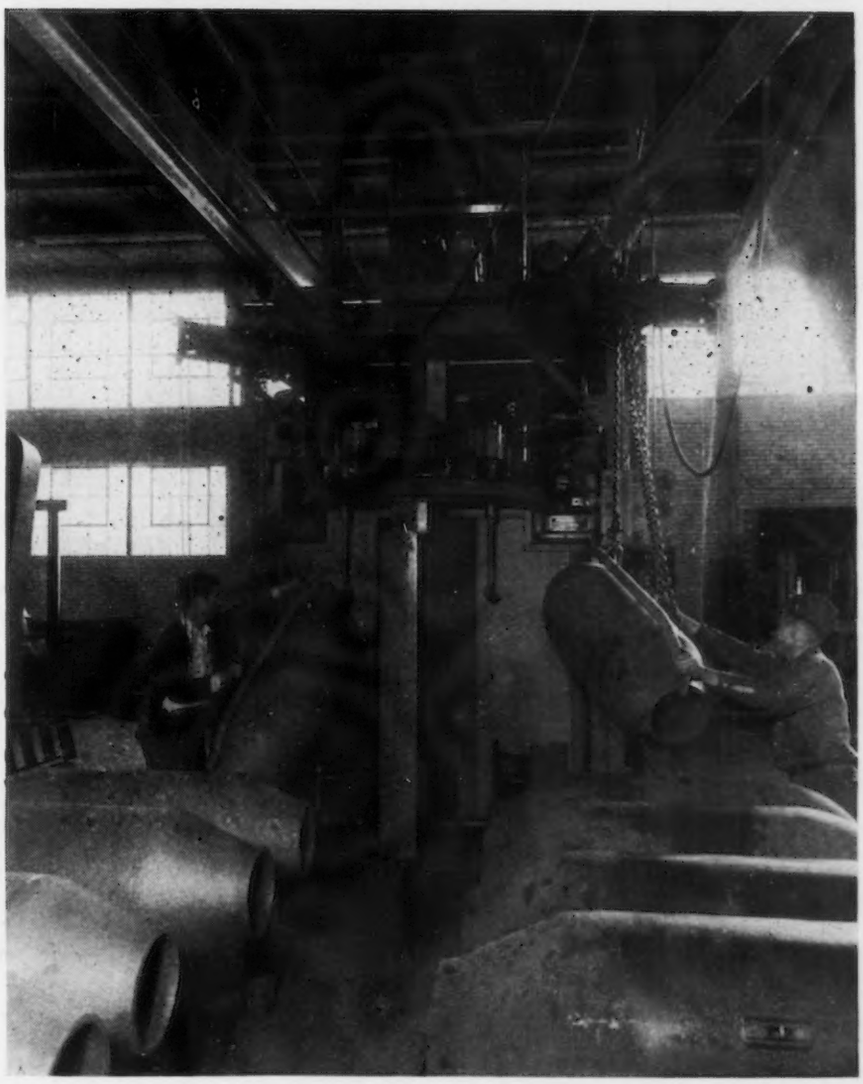
o o o



ABOVE

STEEL blast cleaning equipment has been designed and installed recently for railroad locomotives and for bombs and aerial torpedoes. The accompanying photograph shows a freight locomotive, stripped of all external plate and fittings, being run into a cleaning room built by Pangborn Corp. for the Western Maryland Railroad. An elevator hood from the dust collector mounted over the room, as shown in the photograph, is lowered on the front of the engine boiler section. Two operators direct streams of steel abrasives over the parts to be cleaned, while blowers and dust collector keep visibility and working efficiency at a maximum. Such a cleaning job formerly took a gang of men, with wire brushes and live steam, several weeks. It is now completed in less than two days.

o o o



RIGHT

THIS photograph shows bombs loaded onto and unloaded from the indexing hooks of another Pangborn machine, which carry them into a blast cabinet where outside surfaces are cleaned by a battery of rotary blast units, and inside surfaces by an air blast nozzle. As in the locomotive installation, a dust collector ventilates the entire operation.

Radiography of Light A

By ROBERT C. WOODS
Director of Research
and
V. C. CETRONE
Research Engineer, Taylor-Winfield Corp.

LARGELY due to the rapid wartime expansion of the aircraft industry with its unprecedented use of light alloys, the practice of X-ray inspection has stumbled somewhat and has seemingly been unable to fulfill many of its new-found obligations. The same old techniques and utensils so eminently satisfactory for examination of steel pressure vessels or heavy castings are still in general application for the study of magnesium and aluminum alloys.

A rough survey indicates that many radiographers in this country seem not to realize that different alloys demonstrate a variety of selective tastes and reactions to X-rays of varying wave lengths, nor do they look beyond the overall appearance of a radiograph for the fine points of quality.

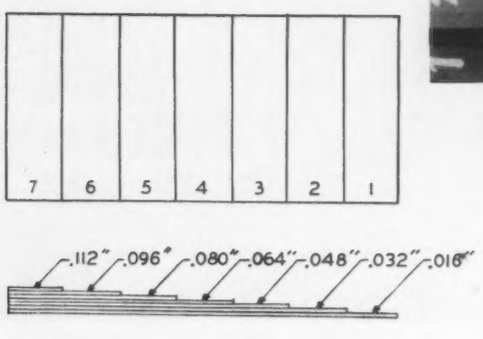
One of the most vital factors to consider in making a radiograph is the subject of contrast. High radiographic contrast is that property of a finished X-ray film which permits the easiest possible visual differentiation between small variations in specimen thickness, structure, or chemical composition. Any technique which contributes to this condition is naturally advantageous and should be most rigidly adhered to. Any other technique is of little more practical value than a mirage. One fact which is monotonously repeated, but apparently not much heeded, is that subject contrast increases rapidly as the X-ray wave length is made longer. To put it another way, radiographic contrast and quality rise as the voltage on the X-ray tube goes down. That this is true can readily be proved theoretically, but perhaps of more popular interest is a visual demonstration.

Fig. 1 is a rough sketch of an aluminum alloy step tablet, composed of copper containing aluminum alloy sheets stacked in a tier so that the first step is 0.016 in. thick, the second is 0.032 in., and so on. Fig. 2 shows four radiographs of this tablet taken using a tungsten target X-ray tube, with four different voltages.

The most satisfactory X-ray technique for producing a "contrasty" radiograph of this tablet is that which results in the greatest photographic density change between any two steps. This point cannot be emphasized too strongly. A radiograph which shows up clearly all the extreme thickness variations of a large, unevenly shaped object certainly looks pretty to the eye, but it is an illusory sort of beauty. Such a technique entirely washes out the minor changes in thickness, the smaller defects, the finer porosity, and usually any chemical inequalities.

In Fig. 2, in order to obtain comparative data, X-ray exposures were so regulated that the radiographic density of step 1 is the same in all four cases. It will be noted, then, that the blackness variation at 12 kv. between steps 3 and 1 is so marked that step 3 is just discernible.

BELOW
FIG. 1—Top and side views of aluminum step tablet.



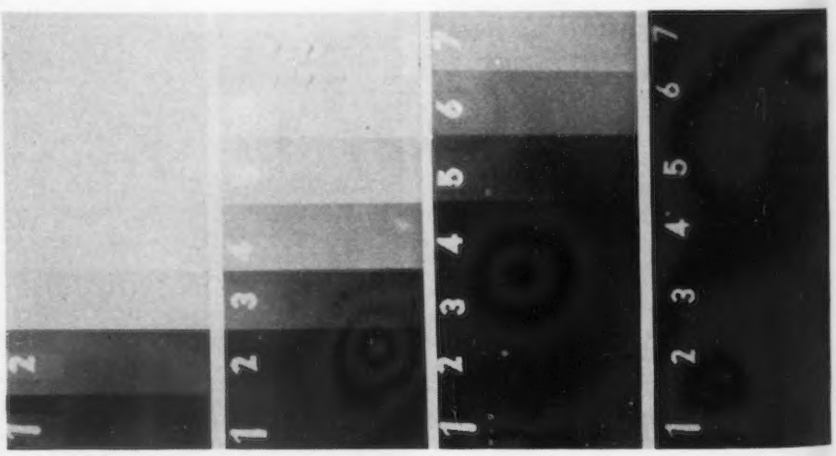


FIG. 2—Radiographs of aluminum step tablet, made with a tungsten target tube. Reading left to right, the voltages were 12, 24, 40 and 400 kv.

Alloys

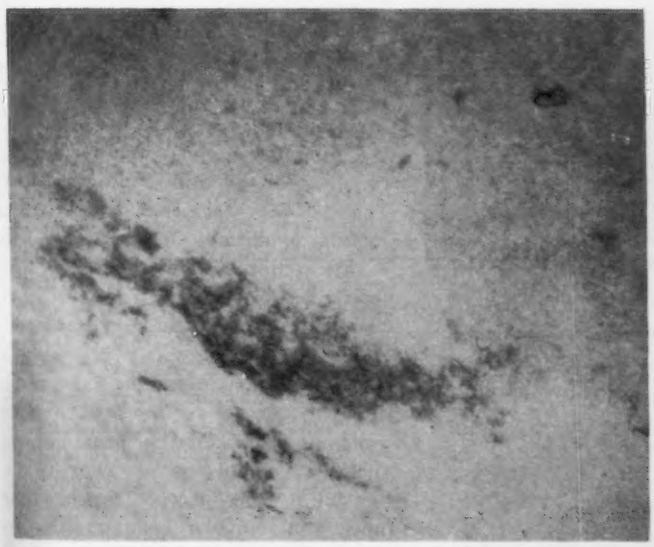
. . . Light metal alloys require new X-ray techniques. The importance of voltage control, especially in the lower ranges, is explained by the authors, who also discuss wave lengths, characteristic radiation, and feasibility of using tubes having targets of tungsten, copper, molybdenum and other metals.

The same tablet radiographed at 24 kv. shows up more steps and smaller density variations from step to step, indicating that at that voltage it requires a much larger change in thickness to produce the same change in photographic effect. At 40 kv., step 7 is easily seen and density changes all along the line have become less marked. At 400 kv., even though step 1 is the same photographically as the other steps numbered 1, the tablet completely loses its identity as such and appears to be a single slab of metal of constant thickness.

If the step tablet test is too far afield from the experience of the average reader to be convincing, more practical examples are readily forthcoming. Fig. 3 shows two radiographs of a section of cast magnesium alloy containing porosity, gas, or perhaps microshrinkage. These areas show up distinctly at 12 kv., but as the X-ray tube voltage is raised, the pictures appear as though an eraser were applied to the defects with increased pressure until at 40 kv. all trace of them has vanished.

In Fig. 4, at the periphery of a magnesium alloy spot weld is a narrow, distinct radiographic white ring caused by the presence of segregated manganese. Notice how the ring fades as the X-ray tube voltage is increased from 12 to 40 kv. This, in spite of the fact that manganese is much more radiographically dense than magnesium.

Fig. 5 shows a spot weld in 24 ST Alclad aluminum alloy with its char-



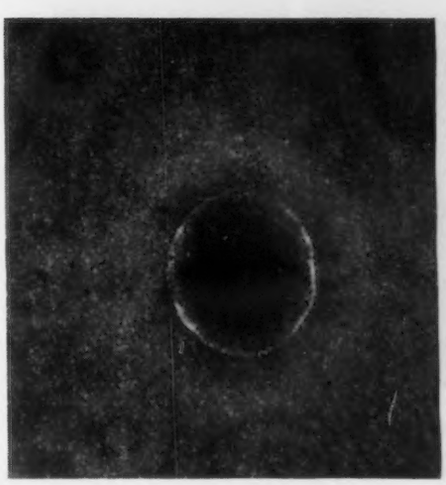
ABOVE

FIG. 3—Radiographs of a section of a cast magnesium alloy made with a tungsten target tube. The picture at left was made at 12 kv. and shows clearly defects which may be porosity, gas or perhaps microshrinkage. Picture at right made at 40 kv. fails to reveal the defects.

o o o

RIGHT

FIG. 4—Radiographs of a magnesium alloy spot weld taken with a tungsten target tube. Picture at left was made at 12 kv. and shows the narrow white ring of segregated manganese as well as other features of the weld, while the picture at the right, made at 40 kv., shows practically nothing.



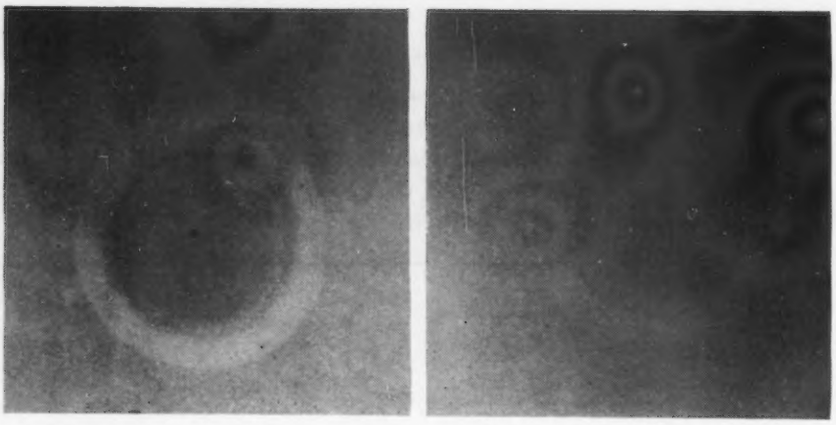


FIG. 5—Radiographs of a 24 ST Alclad spot weld taken with a tungsten target tube. The picture at the left was made at 12 kv. and shows the white ring of migrated copper eutectic as well as a small internal crack. These features are nearly invisible in the picture on the right made at 40 kv.

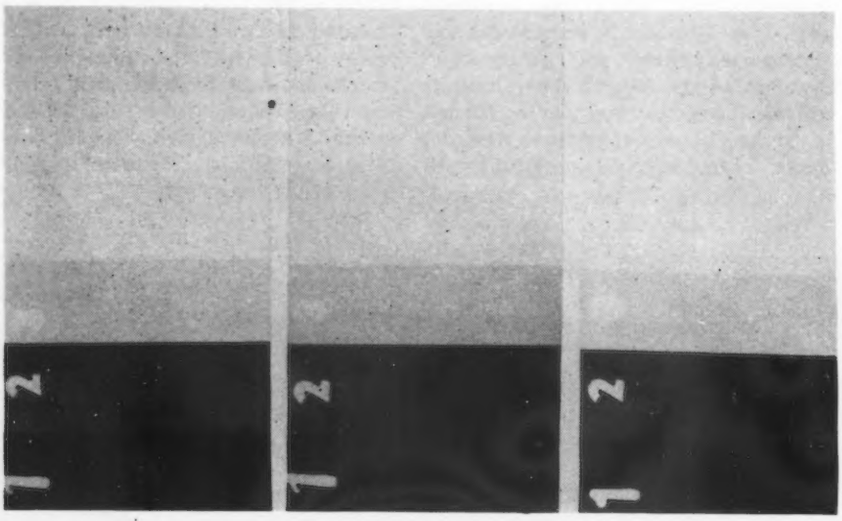


FIG. 6—Radiographs of aluminum step tablet. All three pictures were made at 12 kv. Reading from left to right the pictures were taken using copper, tungsten and molybdenum target tubes respectively.

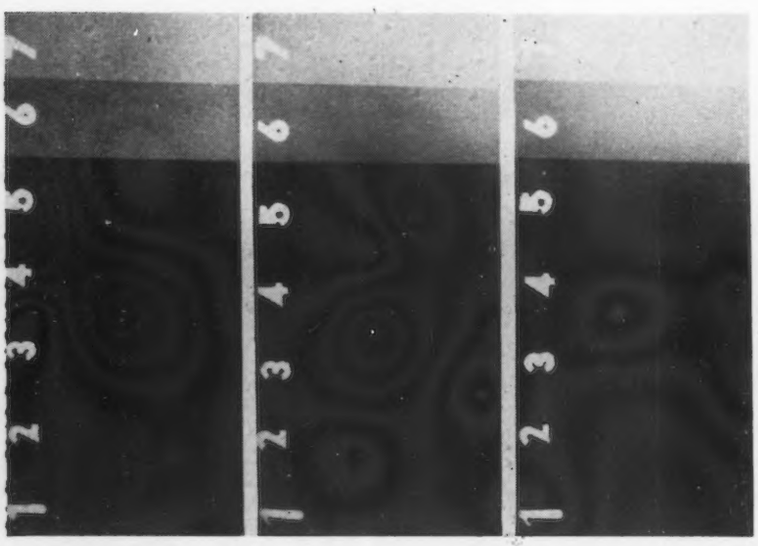


FIG. 7—Radiographs of aluminum step tablet. All three pictures were made at 40 kv. Reading from left to right, the pictures were taken with copper, tungsten and molybdenum target tubes respectively.

acteristic white ring of migrated copper eutectic. Raising the kilovoltage from 12 to 40 almost washes the ring out of the picture.

Many other examples—both practical and theoretical—could be cited to show how utterly dependent radiographic contrast and sensitivity are upon close regulation of wave length through voltage control. Numerous instances crop up of workers struggling to radiograph light alloy structures with X-ray equipment which is too limited in its lower voltage range to disclose anything more than the gross outlines. They juggle the factors of distance, current, time and focal spot size, all to no avail. The absorption coefficients of these various materials—the factors that determine contrast—are not to be fooled by any such prestidigitations.

Many workers, of course, do realize the importance of wave length and its relation to contrast and radiographic sensitivity. From their efforts have come many valuable advances, more especially in the production of proper X-ray equipment specifically designed for work in this light alloy field. Among those who have interested themselves in the development of new techniques for long wave length radiography, there is a growing contingent of those who view the tungsten target tube as unsatisfactory for certain types of work. That is, they feel that for revealing certain conditions in certain alloys, X-rays emitted by tube targets of copper, molybdenum, cobalt, iron, chromium, etc., would prove superior.

The theoretical basis for such a conjecture undoubtedly has something in its favor, but the authors wondered whether the practical application would prove worthwhile. Routine use of different target X-ray tubes would involve considerable purchase expense and the time spent changing tubes every time a different alloy was to be radiographed would be no little nuisance. Accordingly, experimental radiographs were made using targets of copper and molybdenum in X-ray tubes provided with thin beryllium windows designed to increase greatly the output of X-rays of all wave lengths, more especially the longer ones. Through the kindness of the Machlett Laboratories, Inc., a third thin window X-ray tube with tungsten target was furnished, so that comparative tests could be made using both characteristic and general radiation over a range of 5 to 40 kv. The subject of spectral

X-ray emission of the elements is too involved and has been described too fully elsewhere to be discussed at length here. Imagine, though, a single electron speeding through an evacuated tube until it comes into abrupt contact with a copper plate. Several things may then occur, depending on the velocity of the electron and where it happens to hit. More than 99 times out of 100, the only result is the emission of heat or light, or both. However, if the experiment is repeated often enough, the electron will bring about an intra-atomic upset which ultimately returns to normal by expelling an X-ray. This is how general X-radiation is produced and it should be distinguished from that type of X-ray known as characteristic.

Occasionally, the incoming electron will make a direct strike on one of the innermost electrons of some copper atom. Now, if the energy of the attacking electron is sufficient, it will knock the bombarded electron from its customary orbit into a foreign orbit. The electron refuses, however, to maintain this unaccustomed position and forthwith jumps back to its old haunt and simultaneously releases the energy it originally absorbed in changing location. This released energy is called a characteristic X-ray, because its wave length will be of one value if a copper atom emits it, another for an iron atom, and so on. Furthermore, these various atoms are not only selective about the wave length of the energy they emit, they are also fussy regarding the energy it takes to make them emit. Thus, in the story of the electron and the copper plate, if the incoming electron is not shot at the copper atom with an energy associated with 8.97 kv., the copper atom electron will not be dislodged and will therefore not give off a characteristic copper X-ray. On the other hand, if the electron is shot at the copper plate with an energy higher than is necessary, it makes no difference; the emitted characteristic copper X-ray will still have the same wave length as though the incoming energy were just barely sufficient to excite it.

This same condition exists for all the other atoms of other elements, too. For instance, to produce an X-ray characteristic of a molybdenum target X-ray tube, the voltage must be 19.92 kv. With a tungsten target, the figure is 69.30 kv.

There are, then, two types of X-rays to deal with; the broad general range of wave lengths emitted by any X-ray tube and the narrow characteristic band emitted when the voltage on the tube is up to or above the critical value for that particular target material. Thus, with the three X-ray tubes at hand, there is available the general radiations from all three. With the copper and molybdenum tubes it is possible to produce the general X-rays with a superimposed bump of characteristic radiation of each. It is this bump which is supposed to bring the extra benefit.

To return to more solid ground, since it is possible to make a series of radiographs of different alloys using a relatively wide range of wave

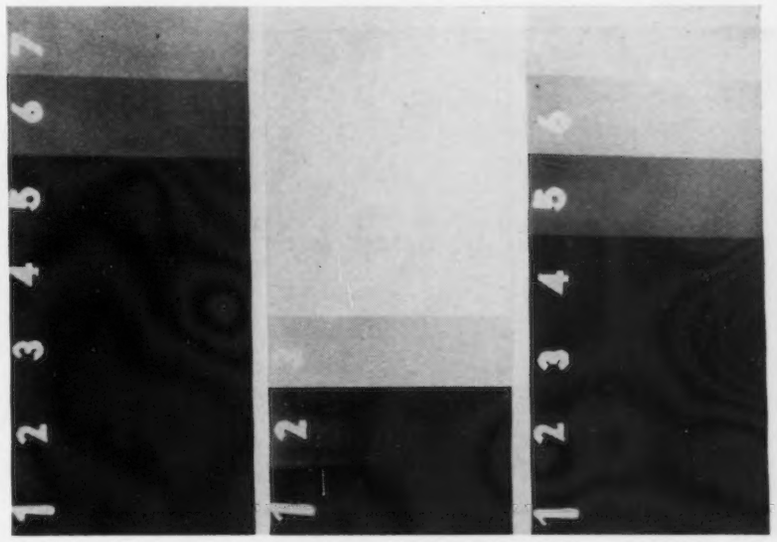
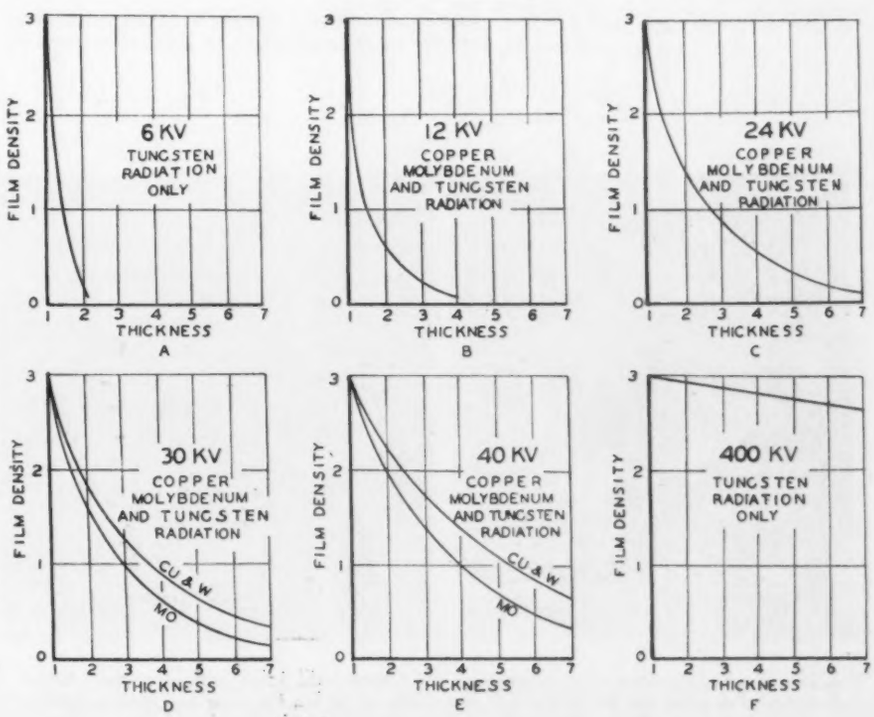


FIG. 8—Radiographs of aluminum step tablet. Picture at the left was made at 40 kv. using a copper target tube; the center picture was made at 12 kv. with a tungsten target tube; and the picture at the right at 40 kv. with molybdenum target tube.

o o o

FIG. 9—Graphs of film density versus metal thickness for different voltages and various target materials.



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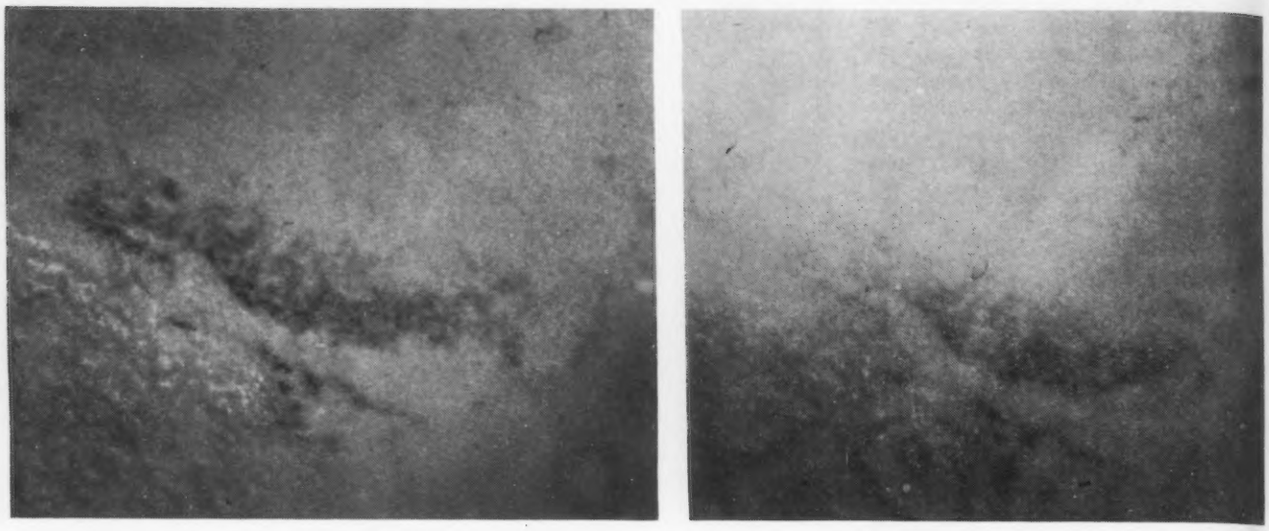

FIG. 10—Radiographs of a cast magnesium alloy taken with a copper target tube. The good picture at the left was made at 12 kv., while the inferior one at the right was made at 40 kv. This is the same subject as is shown in Fig. 3.

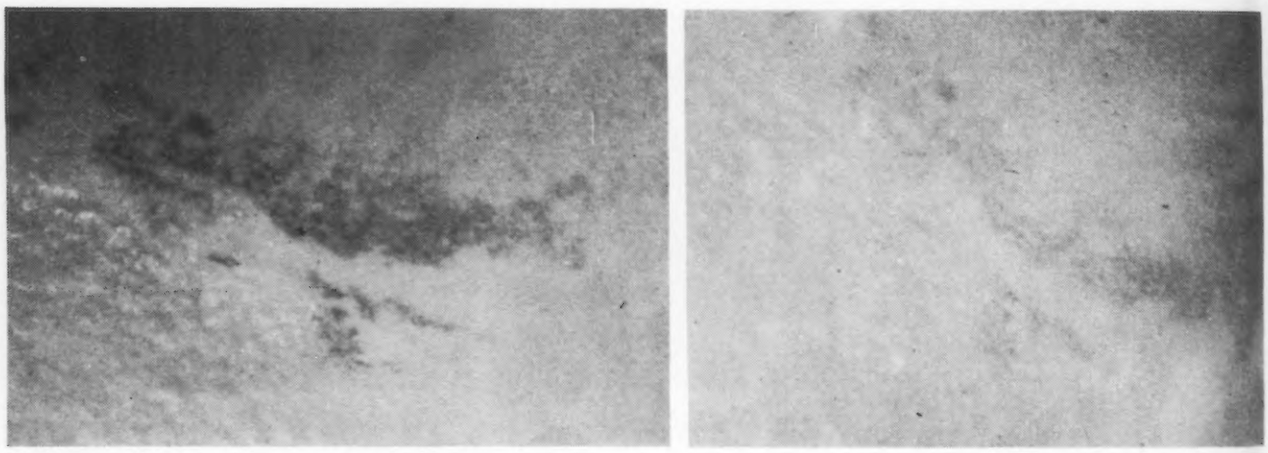

FIG. 11—Radiographs of a cast magnesuim alloy taken with a molybdenum target tube. The satisfactory picture at left was made at 12 kv., the poor one at the right at 40 kv. This is the same subject as is shown in Fig. 3.

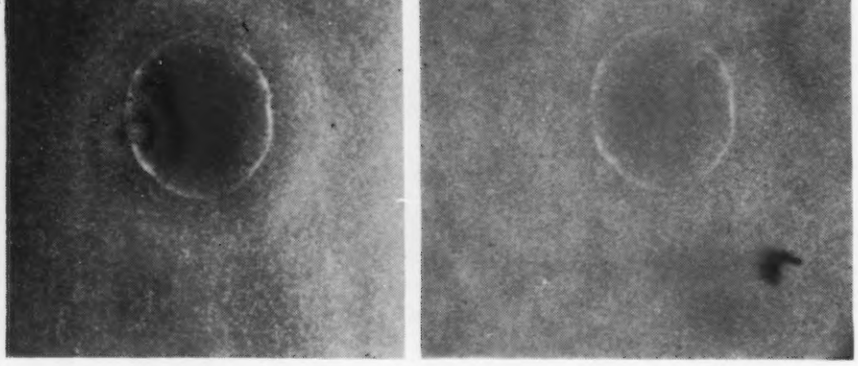

FIG. 12—Radiographs of a magnesium alloy spot weld taken with a copper target tube. The good picture at the left was made at 12 kv., the poor one at the right at 40 kv. This is the same weld as shown in Fig. 4.

lengths—with and without the characteristic ones — results should be somewhat conclusive. Using the same step tablet as previously, three sets of radiographs were made with each of the three tubes, operating at 12, 24, and 40 kv. respectively. At 12 kv. both general and characteristic radiations were emitted from the copper tube, but from the molybdenum and tungsten targets, only general or white radiation could be expected. While Fig. 6 shows the results at this voltage, it certainly does not indicate any contrast benefit to be derived from the addition of characteristic copper X-rays to the beam. Fig. 7 illustrates the same sequence at 40 kv. where both characteristic copper and molybdenum are present, but

with only general radiation emitted by tungsten. By actual measurement of these densities, it is found that contrast is somewhat enhanced by use of the molybdenum target, but the gain is not large enough to cause any excitement. It may, perhaps, be due to the additional bump of low voltage radiation which is still penetrating enough to make itself noticeable. Fig. 8 consists of a step tablet test with the center film made by a tungsten target at 12 kv. flanked on the left and right by the same tablet radiographed at 40 kv. with copper and molybdenum tubes respectively. This may be a somewhat exaggerated case for the sake of emphasis, but it illustrates the point that low voltages assume far more importance in the production of radiographic contrast than the addition of characteristic X-ray bands to higher voltage X-ray beams. While space does not permit the publication of illustrative material, a duplicate set of radiographs—with identical results—was run using a step tablet made of a different aluminum alloy with constituents of magnesium and chromium rather than copper.

Fig. 9 shows graphs based upon film density readings made on the original step tablet radiographs by means of an optical densitometer. The slopes of the curves show degree of contrast attained at the various voltages, steeper slopes indicating higher contrast. It is evident that at 6 kv. the contrast obtained with general radiation from tungsten is exceedingly high. For the thicknesses of aluminum used, exposure times at 6 kv. with copper and molybdenum tubes were so long as to be impractical and so were omitted. As the voltages increase in these graphs, the contrast curves flatten out until at 400 kv. the slope is almost nil.

At 30 kv., the molybdenum tube begins to show a slight edge over both copper and tungsten, but it does not appear so significant that the use of a molybdenum target is to be recommended for the general radiography of light alloys. At 40 kv. the advantage of molybdenum has not gained much and at still higher voltages its benefits would be more than offset by other factors.

As before, from the step tablet tests, experiments were turned toward applications of a more practical nature. The section of cast magnesium alloy with defective areas, the magnesium alloy spot weld with manganese segregation, and the aluminum alloy spot weld with cop-

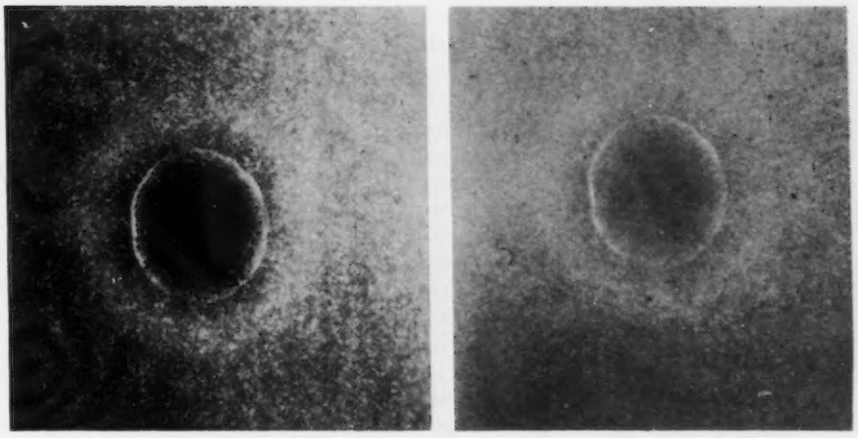

FIG. 13—Radiographs of a magnesium alloy spot weld taken with a molybdenum target tube. The good picture at the left was made at 12 kv., the poor one at the right at 40 kv. This is the same weld as shown in Fig. 4.

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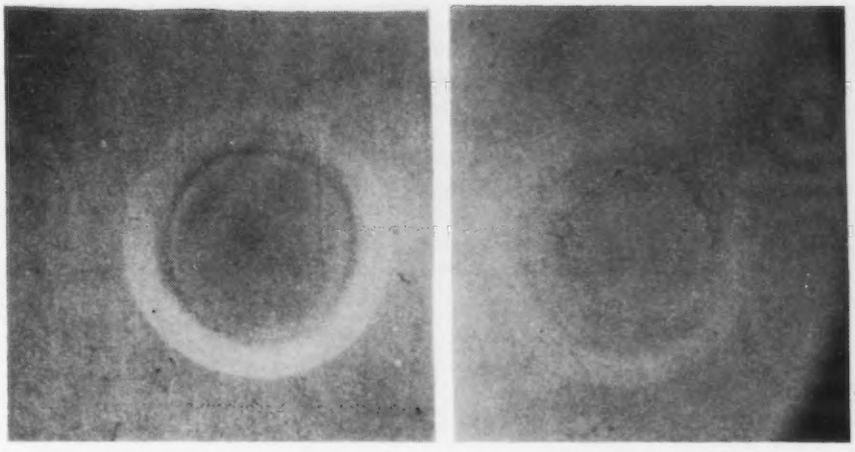

FIG. 14—Radiographs of a 24 ST Alclad spot weld taken with a copper target tube. The satisfactory picture at the left was made at 12 kv., while the inferior picture at the right was made at 40 kv. This is the same weld as shown in Fig. 5.

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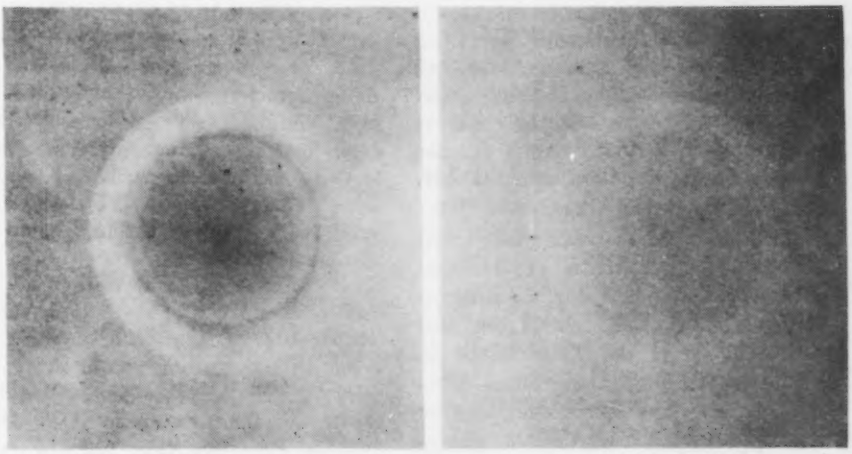

FIG. 15—Radiographs of a 24 ST Alclad spot weld taken with a molybdenum target tube. The satisfactory picture at the left was made at 12 kv., while the inferior one at the right was made at 40 kv. This is the same weld as that shown in Fig. 5.

per eutectic ring were all used again as representative illustrations. They were radiographed with the three tubes operated below and above the critical voltages. As Figs. 10 to 15 show, there is no practical advantage evident in the use of any one tube over any other. The factor of changing wave length alone seemed to produce the desired results, and it appears that one tube should be perfectly capable of attaining as high a degree of radiographic sensitivity as is required without recourse to a large number of tubes.

This work does not pretend to take account of many of the theories involved in X-ray procedures. As previously stated, there is some basis for supposing that certain techniques combined with the use of characteristic radiation should yield results not easily attainable by ordinary radiographic methods (Fig. 16). With unfiltered radiation, results obtained in the excellent technique of microradiography may be superior through use of a molybdenum target operated at 40 kilovolts over a tungsten tube running at the same voltage. This effect might conceivably be due to the additional contrast produced by the extra bump of low voltage X-rays emitted at the characteristic molybdenum band. But it is questionable whether equally good results, or better, could not be obtained at comparable exposure times by use of a thin window tungsten target tube operating at voltages considerably under 40 kv. Certainly superior results should be obtained if the general radiation from, say, a copper or molybdenum tube were removed or at least reduced by filtration, causing the radiograph to be made almost entirely by the characteristic radiation. However, under such conditions, exposure times would become so long as to render such a procedure impractical.

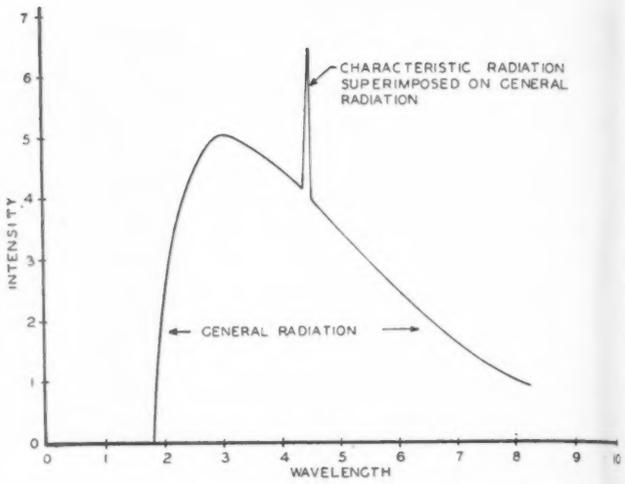

FIG. 16—Effect of adding characteristic radiation to the general radiation of an X-ray tube.

At most voltages, the X-ray output intensity of a tungsten target tube far exceeds that of any other material in common use. Since its efficiency is so high, it would seem logical for radiographers to adhere to the tungsten target while demanding more flexibility as far as emission wave lengths are concerned. In fact, what appears most urgently needed at the moment is a tungsten target tube with extremely low filtration, yet one which will operate at high enough voltages so that its use for both general radiography and light alloy inspection will be economically feasible.

Effect of Titanium on Creep Strength

IN the case of low-Ti steels, E. Houdremont and G. Bandel, in materials report No. 602 of the Verein deutscher Eisenhüttenleute, published in *Archiv für das Eisenhüttenwesen*, have studied the effect of the Ti content, heat treatment and the contents of C, Mn, Si, Cr, Mo and V on the creep strength as measured by D.I.N. and D.V.M. standard methods.

The steady increase in creep strength of mild-annealed Ti-steels between 400 and 600 deg. C. with increasing Ti may be partly ascribed to the effect of the Ti dissolved in the alpha solid solution. Some influence in this direction is exercized by a precipitation process which, on reheating alone, is very sluggish, only becoming more pronounced during the test when a load is applied to the sample. Hence the characteristic shape of the time-elongation curves is associated with a high initial elongation and a permanent set, sometimes even with a negative rate of elongation, which in short-period tests may simulate an excessively high creep resistance. In contradistinction to this precipitation hardening, which is clearly dependent on Fe titanide, a much higher creep strength can be obtained already at lower temperatures by precipitation hardening as due to Ti carbide; owing to the high temperature of solution of the Ti carbides, this hardening effect naturally calls for very high quenching temperatures, in the neighborhood of 1300 deg. It does not take place during the creep test, but already at the tempering temperature, which in these cases may be as high as 700 deg. C. In this case, there is, therefore, no danger of an excessive creep strength being simulated in short-period tests and a more satisfactory behavior is obtained in long-period tests.

At quenching temperatures between 1050 and 1100 deg. C., very high creep strengths can be obtained by additions of Mn, Cr, Mo and Si, provided the tempering properties are not eliminated by excessive additions of either Ti and V simultaneously. Technical applications of Ti steels of high creep strength are partly limited by the reduced tempering qualities of these steels. The production of adequate notched-bar values is also to some extent dependent on a narrow range of compositions or by a loss in creep strength following tempering at high temperatures.

New Slants on Carbide Tools

. . . Mr. Thompson, who in the past has written a number of articles for THE IRON AGE on the application of carbide tools, recites some examples of typical failures of carbide tools in shell machining operations and makes some practical suggestions as to how to overcome these difficulties by modifications in design and tipping practice.

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By GAYLORD G. THOMPSON
District Tool Engineer, Vascoloy-Ramet Corp., Houston, Texas

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IN spite of the almost universal use of carbide tools in the mechanical industries today, a thorough understanding of the correct design and application of these tools is not so universal. Manufacturers of carbide tools have done a wonderful job— and an expensive one —in educating industry in the use of carbide tools. This was and is extremely necessary because the introduction of carbide tools into a plant that has used nothing but high speed steels sort of "tips the bucket," spilling out the residue of old-fashioned metal-cutting routine.

Carbide tools are still a "new breed of pups" to many of the old time mechanics as well as to the embryo mechanics. Both have to be taught the new fundamentals of metal cutting brought about by carbide tools. It is often more difficult to teach the old timer who has been saturated by years of experience in cutting metals with steel, since it is hard for him to divorce himself from the old ideas. To increase the speed when a tool got dull too quickly, or to use negative back rakes and "screwy" angles seems to his mind to violate all the laws of metal cutting procedure. It is just one of these evolutionary developments in the field of applied mechanics and it is a case of falling in line, or else. . . .

Then too, it is surprising how tool designers skid off the correct path of carbide tool design. Especially is this true when they innocently "stick out their neck" designing carbide forming tools. Forming tools that involve intricate multiplicity of angles, especially with one or more shallow angles, is definitely doomed to failure if made from carbide.

Forming Tool Design Errors

There are several good reasons why this type of carbide forming tool will fail:

(1) The high cut-feet speed required for carbide tools to work efficiently invariably causes chattering and this of course, is poison to carbide tools.

(2) The rate of feed of forming tools ranges from 0.002 to 0.010 in. or more, depending upon the size and complication of angles of the piece to be formed. Let us assume that the rate of feed is 0.006 in. and the part to be formed has one or more shallow angles, that is, a slight bevel of about 5 deg. It is evident that as the tool feeds into the work at 0.006 in. per rev. the bevel portion or shallow angle is not getting the full 0.006 in. feed but on the contrary it is being merely scraped or rubbed to form. Naturally therefore, knowing that carbide tools must have the cutting edge buried in the material to work efficiently, this scraping or rubbing action on the bevel portion of the work has an abrasive action on the carbide, dulling it quickly and eventually breaking it by the rubbing pressure.

(3) Complicated forming tools made of carbide are too costly, and difficult to grind with any degree of precision. This alone should discourage any attempt to make carbide forming tools where variable and intricate angles are involved.

Now then, carbide tools can be made to do forming operations and do them fast and with an exceptionally smooth finished product. The answer is to split up the single forming operation into several stages and

use, wherever possible, standard tools in gang tool fashion. Of course there may be the necessity of grinding modifications on the standard tools to suit the work. When this arrangement of tool set-up is made, speeds can be increased with less possibility of chatter so that this primadonna of the metal-cutting tool world can put on her best act on the industrial stage.

A simple example of a carbide form

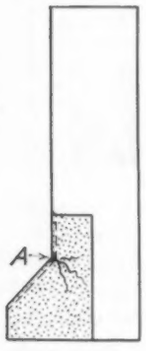

FIG. 1—This carbide form tool used to face and chamfer the nose of a chemical shell cracked at corner *A* due to the wedging action of the chips.

tool is shown in Fig. 1. When this tool was designed, it was expected that it face and chamfer the nose end of a 4.2 in. chemical shell simultaneously with the boring operation. The very simplicity of this tool was one reason why it produced fairly satisfactorily. However, after a period of time in operation the tool started to give way in the corner at *A*. A wedging action took place which culminated in the splitting of the carbide tip similar to the splitting action of an ice pick on a cake of ice.

The destruction of the tool as shown in Fig. 1 is just like destroying two tools simultaneously. In other words, tool costs and tool mortality are double what they would be if *two* tools were used. Then too, this form is *special* and would naturally cost more and take longer to obtain from the manufacturer than if standard tools were used.

Combination Tool Described

Fig. 2 shows how a combination tool set-up takes the place of the form tool shown in Fig. 1. Note that a standard carbide tool with a ⅜ in. square shank performs the chamfering operation simultaneously with another standard tool which also has a ⅜ in. square shank and performs the facing operation. The facing tool has been modified by grinding to suit the operation and position of the tool. Both tools are held in a special block or holder which slides over the boring bar and is adjustable longitudinally so that it can be teamed up to any desired timing arrangement with the boring tool. This adjustment feature permits the resetting of the facing and chamfering tool into new positions to make use of the cutting edges throughout the entire length before resharpening is necessary. Fig. 3 shows the details of the special holder devised for this set-up.

A set-up of this kind (using Vascoloy-Ramet grade E tantalum tungsten carbide tools) bored, faced and chamfered the shells at a speed of 314 ft. per min., averaging 17 sec. per shell, floor-to-floor. The tools performed these operations in such great quantities between grinds that no effort was made by the factory to keep track of this production. At one time

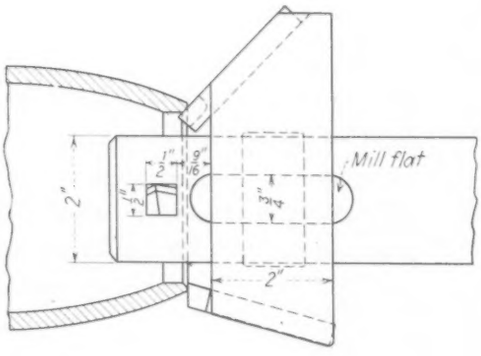

FIG. 2—This special set-up of two carbide tools successfully replaced the form tool shown in Fig. 1.

the tools had been in operation for three weeks—three shifts daily—and were still in operation without regrinding when inquiry was made about their performance. Of course the very light cut or amount of material removed—approximately 1/16 in. depth of cut—was a contributing factor to this excellent performance. Nevertheless, this record would not have been possible with the single form tool as shown in Fig. 1 because of the opposing flow of chips characteristic of this type of tool which tends to shorten the working life of the tool.

Details of the boring tool used in the same set-up will be elaborated upon later (Fig. 7).

Fig. 4 shows a band grooving tool designed with the idea that the extra long portion of carbide tip *A* would permit for longer tool life because of more grindings provided per tool. It is a peculiar characteristic of carbide tools used for cutting off or for grooving operations to wear away at the sides because of the lapping action. Naturally, this affects the width dimension *C*. Where a very close tolerance is to be maintained at *C*, it is an unnecessary expense to provide any longer length of carbide than will equal the life of the tip wherein it maintains the correct width dimension.

Fig. 5 shows a better design of band grooving tool. Note that the carbide tip is slightly longer *D* than the width of the shank *E*. Assuming that the tip extends 1/32 in. beyond the shank on each side, this permits

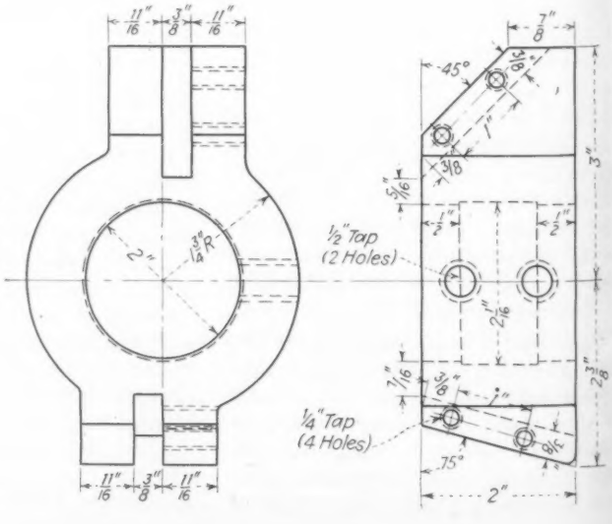

FIG. 3—Details of the special tool holder shown in Fig. 2. This set-up was applied to a Crown automatic lathe.

for greater clearance angles so desirable for carbide grooving tools. Here we have the narrow tip *B*. The feature of this narrow tip is that after several grindings until the width *D* becomes too small, the tip can be removed and the shank used over again for the brazing on of a new tip. The fact that the tip overhangs the sides of the shank, helps to preserve the shank from damaging grinding operations. The cost of a carbide tip designed as shown in Fig. 5 is so insignificant that it is often less than the cost of regrinding the tool.

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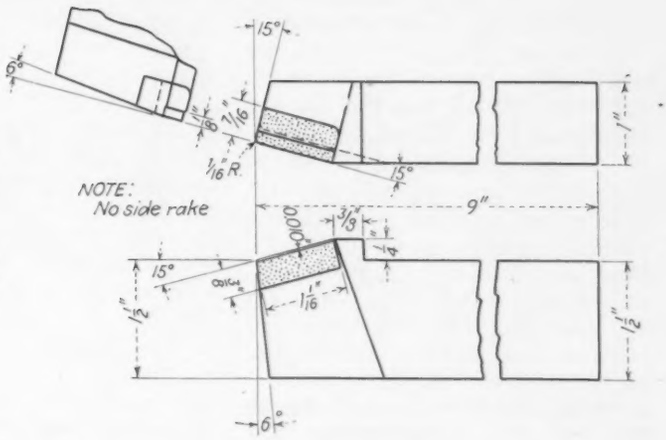

FIG. 6—A rough turning carbide tool designed with 15-deg. negative rake to machine shells with consistently high run-out.

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High Run-Out Shells

A shell manufacturer was having considerable difficulty with the machining of extreme run-out shells and in his desperate effort to overcome the trouble of high tool mortality of carbide tools due to intermittent cutting because of run-outs, he split the roughing operation in two. The poignant fact was that just as many carbide tools were destroyed on the first roughing cut as there was with the conventional one-cut operation.

Here was a problem that involved proper tool design rather than splitting of operations. A properly designed tool would eliminate considerably the destructive forces of excess run-outs. If the first roughing cut destroyed carbide tools, why not revert back to the one roughing cut operation and have the advantage of eliminating the second roughing operation and bring production back to par?

Suppose we consider the homely looking hump back tool shown in Fig. 6. Since this tool is used in a Morey automatic lathe with established and unadjustable centerline of tool based on 1½ in. high shank, provision had to be made for this in that the point of the tool is in the same plane as the top of the shank. To do this and still retain the desired negative back rake of 15 deg. the hump as shown became necessary.

It is a well known fact among mechanics that a lead-in angle is beneficial on a turning tool. Then why not a so-called lead-in angle or negative back rake in so far as it applies to circumferencial operations? Surely, with a negative back rake as shown on the tool in Fig. 6 the brunt of the run-out on shells is taken on the shoulder of the tool and permits the point of the tool to carry on like a shock trooper in the process of whittling off surplus steel. Although this tool is not recommended for intensified production on uniformally running shells, it really takes the gaff when those shells just don't run true. It eases in and eases out of the run-outs. Try a tool like this one—you'll like it on run-outs.

One important factor that should be remembered in the designing of carbide tools is that carbide has a very low tensile strength and therefore all designs should lean toward the incorporation of *compression*. The moment revolving work passes the center (tool face) it has a tendency to pull away from the tool and because of the comparatively weak tensile strength of carbide, pull the tip apart. This fact should always be kept in mind: *Play with compression in carbide tool design.*

One error in the design of a carbide tipped boring tool for heavy duty is the use of a round shank. This can best be illustrated by citing the experience of two different manufacturers who had exactly the same operation to perform with the boring tool as shown in Fig. 7. However, one of the manufacturers decided to use a round shank instead of the square shank as shown on the drawing. When the round-shanked tool was put into operation there was trouble galore. Sometimes a tool would bore a goodly number of units and then fail miserably on the very first unit to be bored after sharpening. The casualties in broken tips went zooming and the costs parachuted into the sad news column of the ledger.

LEFT

FIG. 4—Too big a carbide tip is used on this band grooving tool. Dimension *C* will wear undersize long before the tip is used up by regrinding.

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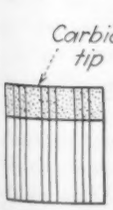
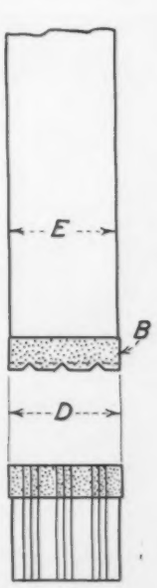


RIGHT

FIG. 5—This band grooving tip is cheap and can be readily replaced when width *D* wears undersize. The overhang at the edges helps preserve the shank when regrinding takes place.



Boring Bit Design

The grinding methods were the first points of investigations. The grinder hand was just inserting the round shanked boring tool into a hand manipulated steel block grinding fixture. He had clamped the set screw down on the flat portion of the shank. Ordinarily, the flat point of the set screw should have rested squarely on the flat of the shank and

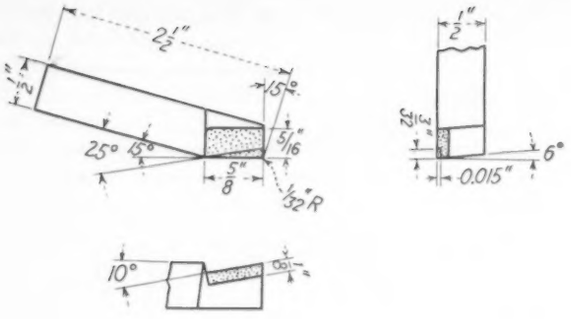


FIG. 7—Finish boring bit used in the holder shown in Figs. 2 and 3. The shank is square.

automatically lined the tool up for grinding. But it so happened that the tool did *not* square up with the grinding fixture because the previous set screw marks on the shank caused the tool to be cocked. The operator never knew the difference until the foreman made a grab for the fixture and called it to his attention in unprintable words.

Now then, if this condition can happen in the grinding fixture, it also can happen when the tool is set in place in the boring bar. And when this happens, errors in angles are multiplied. There will be either too much clearance which will break off the cutting edge of the carbide tool or insufficient clearance which will cause the carbide tip to be pushed off the shank. Can any mechanic or engineer expect anything else but erratic performances when such conditions of tool alignment exists?

When questioned as to why preference was given to round shank boring tools this reason was given: "It was easier and cheaper to make a *round* hole in the boring bar." The other manufacturer who stuck with the square shank boring tool as shown in Fig. 7 had very gratifying results. The tools were ground uniformly from the flat bottom of the shank and when clamped in the boring bar, the flat bottom again insured consistent duplicity of performance.

Another big headache to most everyone concerned with the satisfactory performance of carbide tools is *chip curlers*, or as called by others *chip breakers*. It seems strange that after all that has been said, written and published on this subject, there still exists in many plants, an air of indifference in the grinding room personal as to what should constitute a properly ground chip curler or breaker.

In the grinding room of a large plant, 44 large size carbide tipped tools were counted in one pile where every single one of them had the entire back portion of the tip broken off as shown at *A* in Fig. 8. The reason for this unnecessary slaughter of expensive tools was the excessive depths of the chip curlers that had been ground into the carbide tips. The cutting edges were ground so far below the top surface of the carbide tip that the chips would jam into the wall meant for chip curling and actually push the back portion of the carbide out of the shank. The pathetic thing about this was that the blanks cost from $4 to $7 each and the complete tools from $7 to $10 each, depending upon quantity purchases.

Just think what a tremendous price is paid here for carelessness or indifference! Such exaggerated depth of chip curler is unwarranted. Shallow ground chip curlers can be made to produce the desired results by variation in the width of the curler and also by manipulating the amount of feed under which the tool operates.

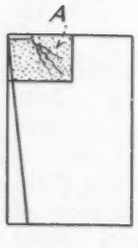


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FIG. 8—Use of too deep a chip curler resulted in repeated failures of the carbide tip as shown by the crack at *A*.

RIGHT

FIG. 9—The wedge-like groove worn into the carbide tip at *A* is erosion caused by heavy scale on shell forgings.

An article on the subject of chip curlers by Mr. Thompson appeared in the July 4, 1940 issue of THE IRON AGE. *—Ed.*

A well supervised grinding room for carbide tools is a gem in any plant and to obtain this desired condition it should be the very first spot of concentration in the educational program wherein the workers are and should be taught the fundamentals of carbide tool grinding. An article on the subject of grinding carbide tools appeared in the Oct. 8, 1942, issue of THE IRON AGE, page 45.

Troubles from Scale

One of the most disturbing factors in shell turning is the way oxidation or scale on the shells eat into the carbide tip during the roughing operation. A carbide tool that has been used in the roughing operation for a while will eventually have the appearance of the tool shown in Fig. 9. Note that little wedge-like groove in the carbide tip at *A*. That's where the scale has attacked the carbide like an army sneaking in to make the kill from the rear. That ever driving force of oxidation on the shell grinds and rubs on a concentrated spot until the carbide tip finally cracks apart from the splitting pressure as shown by the faint lines.

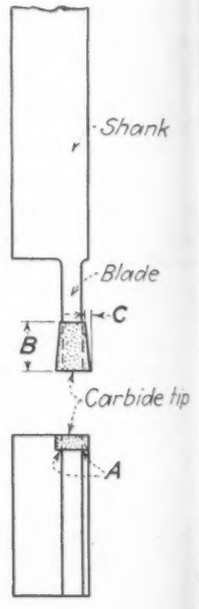


FIG. 10—One use of worn down carbide tips is to braze them on a cut-off tool where the necessity of maintaining dimension *A* shortens the useful life of a bigger piece of carbide.

Use a harder tip? Forget it Mister! You want a softer one—a tip that has greater tensile strength. Then in addition to that, the feed should be heavy enough to crack the scale

before it has a chance to attack the tip.

The cost of regrinding carbide tools is a constant source of irritation to most factory executives. Altogether too often, shanks containing the remaining portion of broken carbide tips are ground, snagged, wheels speedily worn to destruction, good shanks shortened in life while extra machining costs are added to remill a pocket for the new tip—all because of the lack of thinking—thinking that the remaining portion of the broken carbide tip might not be worth a dime, whereas dollars might be spent in the effort to salvage it.

In a factory known as one of the best laid out and most efficiently operated plant in the Southwest, the practice was established that where one-fourth or more of a carbide tip was damaged or broken, the remaining portion, even if 75 per cent of the original size of the tip remained on the shank, was removed and a new tip brazed in place. This eliminated the necessity of remachining the shank and consequently added considerably to the life of the shank. The damaged tip that was removed was placed in proper containers bearing the identification of the grade of the tip.

As time goes on and the tools begin to wear down from constant grinding there are times when broken tips are experienced on worn tool shanks. Here is where the salvaged tips come into profitable use. Having been reduced in size because of breakage these tips come to a definite rescue in replacing broken tips on worn tool shanks. Here again, remachining shanks is avoided and this process can be kept up until the very minimum of cutting edge is reached.

Use of Salvage Tips

Salvaged carbide tips that are too small to be used for turning operations can be used to tip tools with small shanks or cutting off tools similar to the one shown in Fig. 10. Note that the blade is rectangular—having no side or back angle clearances. These clearance angles are not necessary when the carbide tip is permitted to extend beyond the width of the blade as shown at *A* in the sketch. This overhang permits greater clearance as shown at *C* while still retaining the original form of the blade. This means easier and faster grinding and indefinite life of the tool shank. The length of the carbide as denoted by *B* should be kept to a minimum because if a carbide tip is too long, there is a tendency for it to crack in the event of weaving. And one good feature about this tool is that it does not cost anything for the profit producing portion of it—the salvaged carbide tip.

In conclusion, a very important question that should be kept in mind when grinding damaged carbide tools is whether or not it is cheaper to remove the tip and braze on a new one or to wear out wheels and waste time and material grinding back the shank in order to use the remaining portion of the broken tip. Then again, the part of the carbide tip left in the shank may have been damaged and not be noticed until put back into operation.

On the other hand, a good practice is to have all carbide tools returned from the shop for resharpening, be inspected by some designated authority who will sort out the tools for rebrazing or grinding. In the aforementioned plant, a girl was trained to braze tips on shanks by the use of acetylene torch and the result proved extremely gratifying. Later two girls were added to do the grinding and this too proved very satisfactory. It seems that the girls have a deftness of touch so desirable in the preparation of carbide tools.

Exhaust Pipe Jig

AUTOMOTIVE passenger car and truck manufacturers have found that exhaust pipes can be manufactured in almost all sizes and shapes, which allows them to design for speed, power and stamina without regard to the exhaust line. Standard practice for fabricators is to have templates made of wood of whatever width or thickness is required, and cut to the shapes which the bent tubes must fit. Eventually this causes a serious storage problem.

American Welding & Mfg. Co., Warren, Ohio, recently constructed a special jig, shown in photograph, consisting of a 12-ft. length of heavy steel pipe secured horizontally between two V-shaped standards. Along this pipe at intervals of anywhere from a few inches to a foot or more are movable, adjustable collars from which extend arms with swivel clamps which can be turned in any desired direction to hold even the most curvacious exhaust outlet pipe. With a wrench, any combination of these arms can be set up.

Flame Hardening Tank Turret

THE war has brought many problems of manufacture, design, production, materials handling and other techniques to plants that normally have specialized in peacetime products only to find themselves faced suddenly with a task of making items of war equipment never even remotely on their product list before.

So it was with the American Welding & Mfg. Co., Warren, Ohio, specialists in the manufacture of welded steel rings of all types when they were awarded a contract for the manufacture of rings for the main and anti-aircraft turrets used on tanks.

Each turret has rings which fit inside one another in such a way as to permit the turret to swing freely through the 360 deg. of a circle.

To insure against turret failure under the severe climatic and operating conditions in which they are used, the Army specifications for these rings call for bearing races to be hardened to a specified depth. To meet these specifications and handle the large production anticipated, flame hardening was decided upon as the best method of hardening the ring races.

The volume of production required made heat treating the entire ring before machining not only impractical, but virtually impossible with the furnace and quenching facilities available. Moreover, the physicals of quenched and drawn rings made it exceedingly difficult to perform the necessary machining operations afterwards. On the other hand, heat treating after machining was found to distort the rings to such an extent that straightening them was often impossible, thereby greatly increasing rejections. In addition, with heat treating, tapped holes in the rings, of which there are about 100 in the units that make up a single turret ring assembly, had to be individually plugged either with copper or powdered asbestos to prevent damage to the threaded portions.

As purchased from the mill, the rolled steel section is approximately the contour of the finished part and is alloy or carbon steel, depending upon whether the part is to be load bearing or not. After forming into a ring, flash welding, reheating, sizing and flattening, the rings are machined to exact shape.

It is necessary to harden the faces that form the bearing race on which the turret revolves. The hardness must be uniform throughout the face. When flame hardening of these races was tried, it was found that hardness was uniform, distortion was negligible and the surface did not require any further machining or grinding operations.

Through the collaboration of the Linde Air Products Co., various flame heads were specially designed to heat uniformly and rapidly the various contours of the ring races. The flame heads, some of which are shown in Fig. 1, are generally the shape of the face in the ring. In addition to having flame ports, they also provide for the immediate quenching of the race by having ports through which the quenching medium is sprayed onto the race immediately after it passes the flame.

Special circular jigs were designed by American Welding & Mfg. Co. engineers to hold the various sized rings in a vertical position and rotate them past the flame at the predetermined speeds necessary to attain the proper heat before quenching.

Holding the work in the vertical plane was found to have several advantages over mounting it at an angle as has frequently been the procedure followed by other manufacturers during similar work. Immediate advantages are the increased ease and speed with which the work can be loaded and unloaded from the jig table. With a plant striving to push production to the very limit, anything which will promote speed of handling parts assumes major importance.

Another advantage, wholly technical, is the more certain elimination of distortion in the flame hardened rings through the ability to quench the rings completely by immersion in a tank full of the cooling medium. With the angular arrangement of table, the work is cooled only to the extent provided by the quenching spray itself. This is, of course, sufficient to harden the race; but it does not provide the additional cooling possible by subsequent travel of the ring through a tank filled with the coolant.

The jig arrangement with the flame hardening operation in action is shown in Fig. 2. As the rings are revolved in the flame area they are heated quickly and immediately quenched by a coolant.

Immediately after the spray quench, the ring passes into a tank bath which evenly and quickly dissipates the heat that remains in the ring and the jig. The tank serves as a reservoir for the coolant from which the quench spray is pumped. From the tank, the coolant is recirculated through a filter to remove dirt and foreign matter and then is pumped back to the flame hardening head. The operation is continuous with the quenching medium being used over and over again.

By experiment, speeds at which the work could be moved past the flame hardening heads were carefully worked out to control the degree of hardness and depth of case for each size of turret ring and each shape of ring race. For example, for one of the larger rings, the race area travels 7 in. per min. past the flame head, thus providing adequate time for full heating but not sufficient time to cause burning or melting of the metal.

Surface speeds for hardening the various rings range from 6 to 7.5 in. per min. The flame heads are of various shapes, and the flame ports are

Ring Races

By THOMAS E. LLOYD
Cleveland Editor, The Iron Age

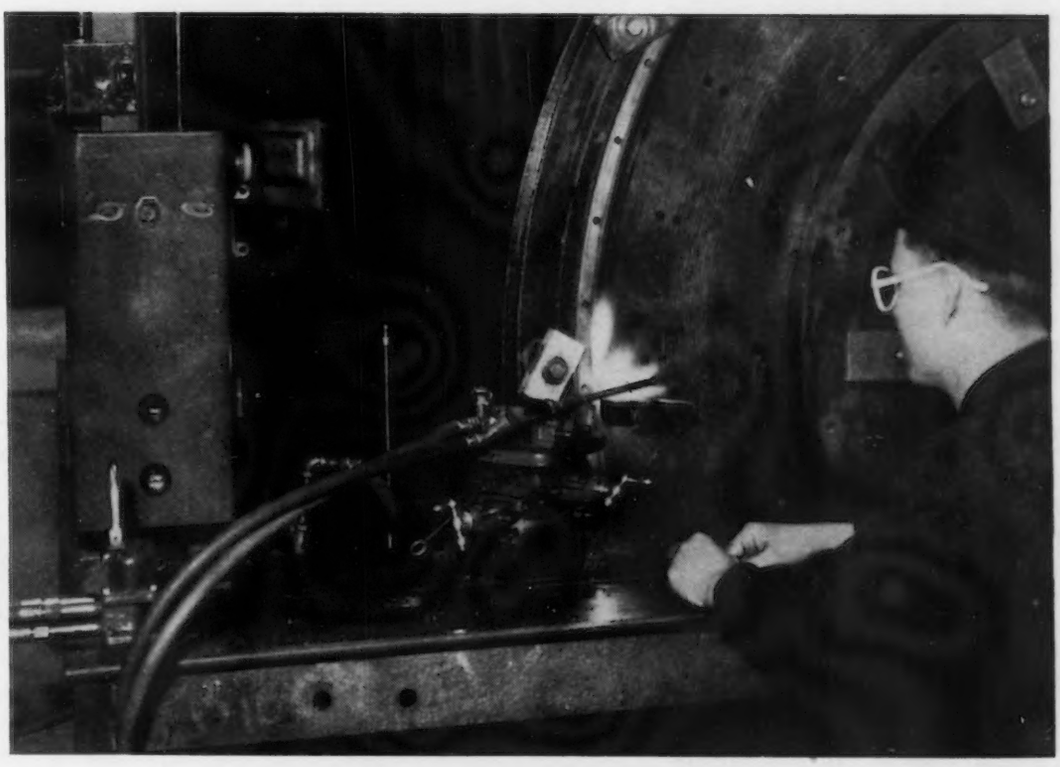
. . . The use of flame hardening has averted what might have been a bottleneck in the production of turrets for armored trucks and tanks. Production costs have been cut and machining operations made less difficult.

of such number, size and location as to permit the proper distribution of heat over the race section. Oxygen and acetylene pressures must be closely controlled to insure the proper heat input and depend to some extent on the size and number of flame ports in the flame head. In the ring hardening work at American Welding, oxygen pressures of 8 to 18 lb. are being used, depending on the shape and size of the area being hardened. On the other hand, it was found that the acetylene pressure should be held practically constant at 5 lb.

The flame hardening results are checked at frequent intervals. Using a ring which has been rejected for some other fault, tests are made regularly by sectioning and etching portions of the ring. In this fashion, a very close control can be exercised and the degree of hardness kept well within the specified limits.

ABOVE

FIG. 1 — These flame nozzles are typical of the various shapes used in flame hardening the bearing races. Their unusual shapes permit an even distribution of flame on the race from the upper sets of ports, while through the lower ports a coolant is sprayed, providing an immediate quench.



RIGHT

FIG. 2—This circular jig was designed by American Welding & Mfg. Co. engineers to flame harden the ring races. The jig revolves in a counter-clockwise direction at speeds that are controlled through a speed-changing mechanism to permit the use of the jig for several different sizes of rings. As the race is brought into the flame area it is heated and immediately quenched. A tank below the table serves as a coolant reservoir and also dissipates the heat remaining in the jig and in the race.

Low Temperature Welding of Broken Tools

A NUMBER of methods are now being successfully used for repairing broken high speed steel tools, such as milling cutters, saws, dovetail form tools, reamers, taps, drills and broaches. These methods include atomic hydrogen welding

FIG. 1—Tap fractured through the shank and body. The edges of the crack have been beveled preparatory to welding with Castolin Eutectic alloy No. 16.

(General Electric), special methods of welding with high speed steel rods (THE IRON AGE, Oct. 22, 1942, p. 68), silver soldering and now low temperature welding or brazing. The Eutectic Welding Alloys Co., 40 Worth Street, New York, has recently prepared a chart illustrating a number of case histories of broken tools welded with three of its low temperature welding rods. The process may be applied to salvaging broken tools without the necessity of reheat-treating them. Usually a 60 to 80 deg. chamfer is used at the broken edges so as to localize the pre-heating of the surfaces which is necesary. A few examples will suffice to clarify the technique.

The broken tap shown in Fig. 1 was repaired by using Castolin Eutectic alloy No. 16. This is a high tensile (117,000 lb. per sq. in.) brazing alloy that can be applied at temperatures from 1400 to 1600 deg. F.

The edges of the fracture are first chamfered to an open V as shown, the joints are coated with a special flux (Autochemic No. 16B) and the parts preheated locally to 1400-1600 deg. Then the two pieces are clamped together for brazing. Brazing is done with the No. 16 alloy rod, using a slightly excess acetylene flame. Preheating is also done with the torch. In both cases the cone of the flame is kept from 1 to 5 in. away from the metal surface. A two-flame torch is helpful in obtaining uniformity of preheating.

Fig. 2 shows a reamer repaired in a similar manner. In this example the tool had broken off at the shank. It is shown in the as-welded condition.

The broach shown in Fig. 3 had cracked through one of the mounting holes. The other mounting screw hole had worn oversize. These holes were built up with a medium hard surfacing material called Bronzochrom. As deposited with a reducing flame, it has a hardness of 180-235 Brinell and is readily machinable. Melting temperature is 1000 deg. The broach is shown after being remachined.

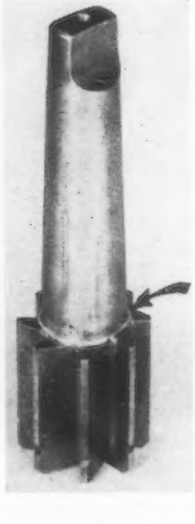


FIG. 2 — Arrow points to low temperature weld made with Castolin No. 16 alloy rod at the junction of shank and body of a reamer.

FIG. 3—The tapped holding holes on the back of this broach have been built up by Bronzochrom resurfacing alloy which is readily machinable.

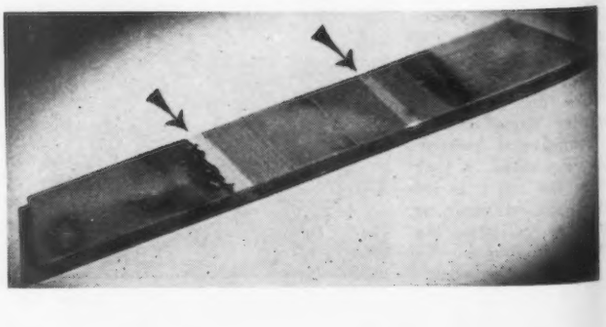


FIG. 4 — Finning tool made of scrap high speed steel short blades brazed to a mild steel central body. The low temperature employed did not affect the hardness of the high speed steel.

Where the heat treatment is to be retained on alloy steels or where small bits of high speed steel are to be tipped on low alloy shanks, Castolin Eutectic alloy No. 1800 is used. It has a tensile strength around 50,000 lb. per sq. in. and is fluid between 1000 and 1200 deg. F. It is available in flat rods or in 1 in. strip, 0.005, 0.010 and 0.020 in. thick. A tight fit is necessary between the parts.

This type of material can be used to make extension reamers from standard reamers by butt welding them together. The ends are ground square and smooth, then coated with flux. Each end is heated separately and then one end is precoated or "buttered" with alloy No. 1800. The two pieces are clamped together in an alinement fixture and the ends heated with a soft flame (large excess acetylene) until the alloy coating material remelts. The parts are then pressed together. A similar technique is applied to salvaging broken drills.

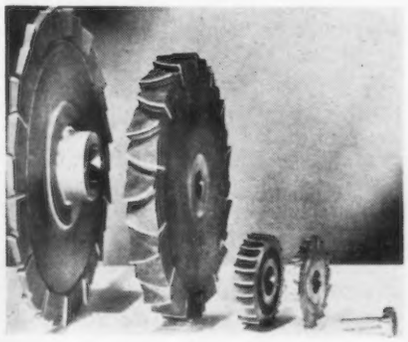
The same technique may also be applied to welding high speed steel cutting blades to low alloy shanks. Fig. 4 shows a double end tool for finning aircraft cylinders, with the central section made of mild steel. A No. 16 alloy was employed. Joint preparation is a double V.

New Equipment . . .

Small Tools & Gages

Accessories such as milling cutters, drills, vises and other small tools and accessories are described in this week's news.

DUE to the chatterless flowing action of the new curved tooth cutters offered by the *Aber Engineering Works, Inc.*, Waterford, Wis., these cutters operate with less friction. The flowing action allows no lapse of cutting contact. Each tooth begins to cut metal just as its predecessor is finishing its cut. Plain milling cutters are available in diameters of from 2⅛ to 6 in. and staggered tooth side milling cutters in diameters of from 2⅛ to 14 in.

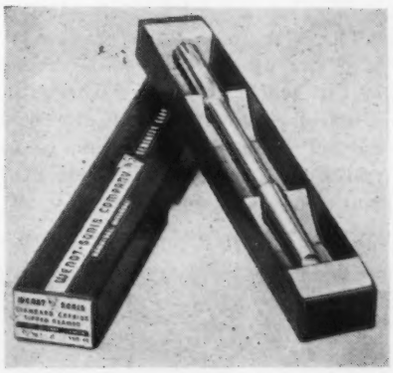


Spiral Countersinks

Refinements in the design and manufacture of spiral fluted countersinks and counterbores are reported by *Schrillo Aero Tool Engineering Co.*, Los Angeles. These tools have hardened and ground shanks unaffected by chucks or wear. It is claimed that the special spiral design of these cutters results in better chip clearance.

Reamer Carton

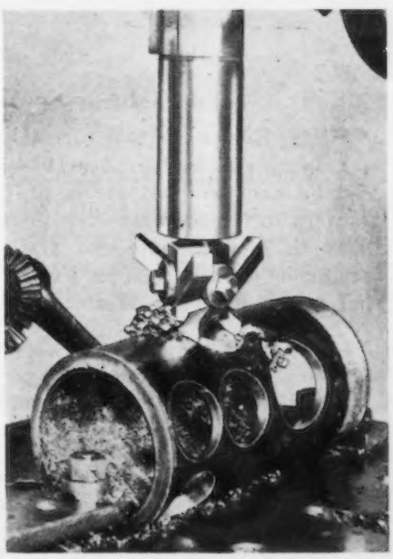
A NEW carton for packing carbide tipped reamers has been designed by the *Wendt-Sonis Co.*, Hannibal, Mo. The carton provides extra protection to reamers when they

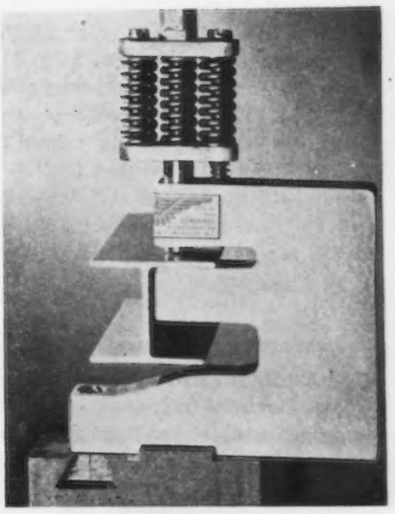


are not in use at machines and easy-to-read labels facilitate stock keeping. Various sized die-cut fillers compensate for the differences in length and diameter of the reamers.

Adjustable Hole Cutter

ROBERT H. CLARK & CO., 3424 Sunset Boulevard, Los Angeles, has developed a three-blade adjustable hole cutter with which smooth finished holes ¾ to 4½ in. diameter can be made in metals, plastics and other materials. The cutter is designed for use in electric drills, drill presses, lathes and pneumatic motors. The hardened and ground pilot is removable. For use in a drill press, a lead drill instead of a pilot can be used. The cutter will cut curved surfaces through heavy steel.





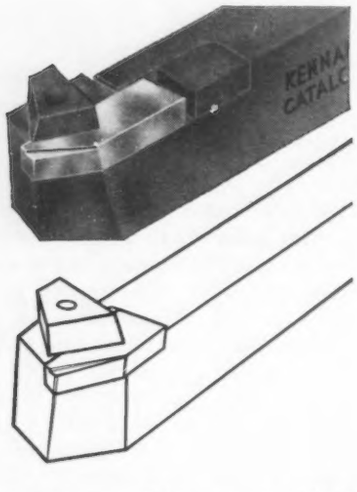
Hole Punching Unit

THE newest addition to the line of punching and notching units offered by the *Strippit Corp.*, 1200 Niagara Street, Buffalo, is the Wales type E hole punching unit for punching extruded shapes and sections. Center projection carrying die member extends into all shapes of extruded work and provides clearance for the legs in lower gap. The work slides easily into level position on top of the die where it is pierced by the

punch. Nothing is attached to the ram of the press. Each unit is made up of punch, die, holder, stripping spring and guide. The flexibility of positioning Wales units makes possible using a template as a guide for quick pattern set-ups.

Carbide Tipped Tool

MC KENNA METALS CO., 144 Lloyd Avenue, Latrobe, Pa., has made available a new type clamped-on carbide tipped tool. The



clamp is secured by a screw which is inserted from the bottom of the tool through the shank to the top of the clamp. As the tip is reground following use, it is moved forward and out under the clamp, shims being placed behind it. When the tip becomes too small, it frequently can be brazed into a small shank for lighter turning or boring operations. The tools are available in three square sizes, 1, 1¼ and 1½ in. and in two flat sizes, 1 x1⅓ in. and 1½ x 2 in.

Adjustable Spacing Collars

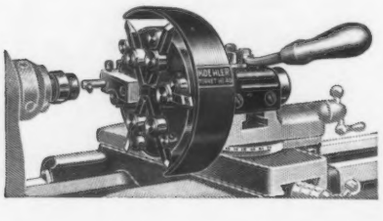
TO meet wartime milling machine production demands, a heavy duty adjustable spacing collar for milling machine cutter arbors, with hardened and ground backing plate, is offered by the *Dayton Rogers Mfg. Co.*, 2835 12th Avenue South, Minneapolis. This new collar has maximum overall width to compensate, when necessary, for severe tightening of the milling machine arbor nut on heavy production requirements. It is provided with an engraved indicator, showing which way to make the necessary adjustment. The maximum overall adjustment provided is ⅛ in. by half thousandths.

Boring Bar Holders

FEATURING a dual clamping arrangement that separately holds the boring bar in the holder and the holder to the lathe, the *Clayton Mfg. Co.*, Alhambra, Cal., announces production of large type bars and bar holders for lathe swings from 9 to 36 in. The design allows the removal of the holder from the lathe without disturbing alinement of the boring bar. Permanent calibrations on each end of the bars eliminate need for file marks or chalk markings.

Turret Heads

THE Kohler six-tool turret head, using standard 5/16 in. tool-bits, can be used on most lathes of from 9 to 12 in. swing where the distance between top of compound rest and centerline of lathe is from 1 to 1-7/16 in., according to the *Master Machine Co.*, 19 Grove Street, Stamford, Conn. This turret head will convert the ordinary engine lathe into a semi-automatic turret lathe by removing the tool post and placing the turret head in its position. The turret heads are so constructed that each tool bit is independently adjustable for height by adjusting screws allowing for sharpening and wear of the tools. An 8-tool turret head is also offered.

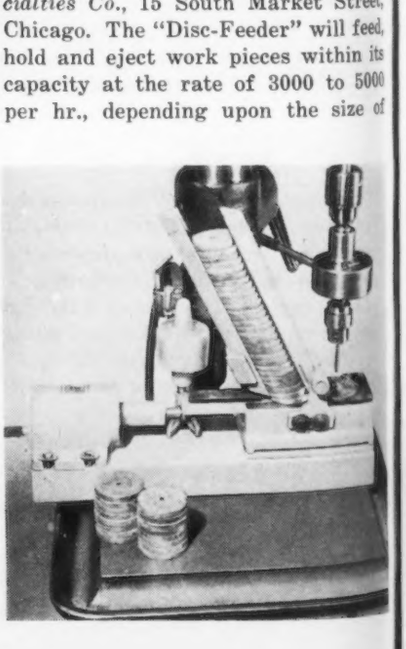


Pneumatic Drill

A NEW lightweight pneumatic drill, known as the size 00A drill, is offered by the *Ingersoll-Rand Co.*, 11 Broadway, New York. The drill weighs less than 2 lb. and is powered by a multi-vane air motor. A built-in speed regulator can be set for desired performance. Lubrication is provided by a built-in automatic oiler. A chuck shield offers protection to the operator and enables him to guide the drill more effectively by grasping the shield with the fingers of his free hand.

Work Feeder

A NEW semi-automatic fixture for feeding and holding work while drilling and tapping operations are performed is announced by *Mead Specialties Co.*, 15 South Market Street, Chicago. The "Disc-Feeder" will feed, hold and eject work pieces within its capacity at the rate of 3000 to 5000 per hr., depending upon the size of



the work. The feeder can handle round pieces, as well as squares, rectangles, oval and irregularly shaped blanks. One or more drill bushings can be mounted above the work where desired. The fixture can accomodate work varying from 1 to 3 in. in diameter with a thickness of from ⅛ to ¾ in. It is operated by a foot control valve which changes the work when the pedal is pressed and holds it in position for machining until the pedal is pressed again.

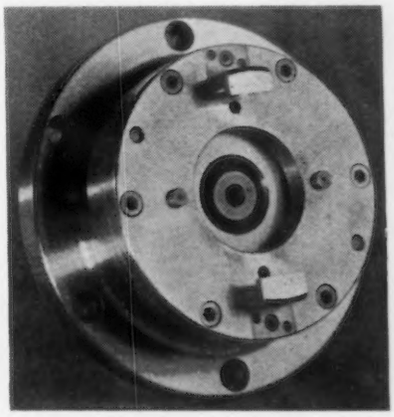
Rotary Table

A SIX inch rotary table, small enough to get into usually inaccessible places, is now being produced by the *Duro Mfg. Co.*, 800 East

61 Street, Los Angeles. Faster rotation is possible as the new table has a worm gear ratio of 60:1, giving a 6 deg. rotation for one turn of the crank. Back lash has been eliminated by an eccentric adjustment between the worm and gear. The table's center hole is ⅝ in. in diameter.

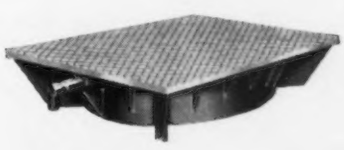
Angle Vise

QUICK, accurate set-ups at any angle are possible with the new Palmgren angle vise offered by the *Chicago Tool & Engineering Co.*, 8348 South Chicago Avenue, Chicago. The vise can be used on a drill press, milling machine or grinder and can also be used like an ordinary vise when lowered. Jaws are available either plain or grooved for holding round pieces. Swivel bases can be furnished for bench or machine work. It is made in sizes from 1½ to 8 in. jaws.



Finger Chucks

SPECIAL compensating type finger chucks have been added to the Airgrip holding device line of *Anker-Holth Mfg. Co.*, 332 South Michigan Avenue, Chicago. The design of the chuck permits one finger to pull in farther than the other thereby compensating for varying thickness of pieces to be held. Pieces are located from a fixed center stop position. The piece is driven by two fixed driving pins and the part is held against the chuck face by the two fingers. Body is flanged and drilled for direct mounting on the spindle nose. Range of finger travel can be made to suit requirements. These chucks are available in a range of sizes.



Precision Lapping Plate

SMITH precision lapping plates, made by the *Smith Tool & Engineering Co.*, 806 North Sandusky Avenue, Bucyrus, Ohio, are designed for developing a true plane of close tolerance. The large elliptical rib with internal spider rib construction and supporting ribs to outer edges are so designed that their depth and placement give maximum rigidity and stiffness with a minimum of deflection. All plates are precision lapped to a final flat surface and grooved at an angle. Plates are available in sizes ranging from 8 x 12 in. to 48 x 120 in.

Surface-Angle Plate

THE Wilberton combination master surface-angle plate, introduced by *Thomas Wilberton & Co.*, Cedar Grove, N. J., is designed for speeding up inspection on production operations with controlled accuracy and the avoidance of errors, within tolerances as close as 0.00005 in. The elongated slots in the angle plate enable use of draw studs for holding

the work under inspection. Pieces as heavy as 5000 lb. can be held in position without strain. The top surface of the angle plate is hand scraped perfectly parallel to the surface plate, assuring a quick, accurate check on any work.

Diamond Wheels

METAL bonded diamond wheels for grinding and lapping tungsten carbide are available from *Dia-Tool, Inc.*, 320 Yonkers Avenue, Yonkers, N. Y., in grit sizes from 80 to 400. A feature of these wheels is their long life brought about by the durable metallic matrix in which the diamond particles are held. Extreme density of diamond concentration accounts for fast cutting action.

Grinding Wheel

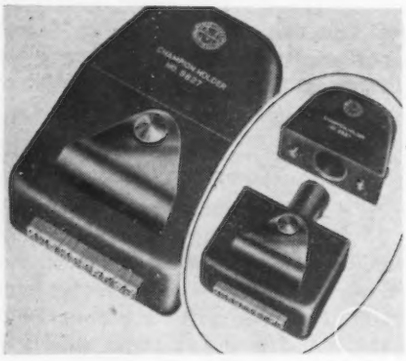
A NEW grinding wheel for use with tungsten carbide metals, drill points and all kinds of steel has been announced by the *Sterling Grinding Wheel Division*, Tiffin, Ohio. The wheel is made of a new material which lengthens life and improves cutting action.

Steel Type Holder

DESIGNED for marking the ends of shafts and other parts having a center hole, a steel type holder which may be used either with individual type or with logotypes is offered by *New Method Steel Stamps, Inc.*, 145 Jos. Campau Street, Detroit. When furnished with a knurled shank, the holder is used for hand stamping and with a turned shank, it may be mounted in a press. The holder is equipped with a floating locating pin backed up by a light spring to insure proper register of markings around the center. When the full capacity of the holder is not used for type, blank spacers are supplied.

Marking Tool

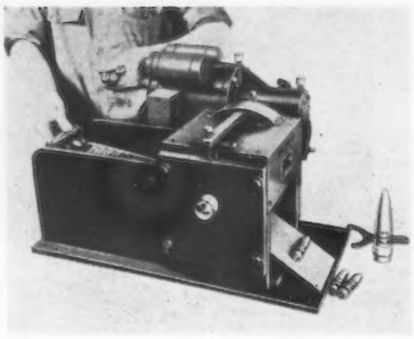
A HOLDER which can be quickly and easily converted for use in a press or with a hammer, depending upon the marking application, has been added to the line of *James H. Matthews & Co.*, Pittsburgh. For hand stamping applications, the removable head is placed over the shank



and held in place by means of a set screw, tightened at the side. For press use, the head is removed and the shank is placed into press equipment. Steel type is changed by applying slight pressure on a spiral spring, which disengages the spring clip from the type groove. Type is available in sizes ranging from 1/16 to ½ in.

Type Holder

FOR marking multiple characters that change, a new heavy-duty style of holder for stamping with steel type has been developed by the *Acromark Co.*, 341 Morrell Street, Elizabeth, N. J. This tool has a type holding clip which allows type to be quickly changed by thumb pressure on the top of the clip. Each holder is designed to center the striking force directly above the type. Large holders are furnished with an eye so a handle can be used or with fullers on the sides so that a heavy wire can be improvised for holding while striking.

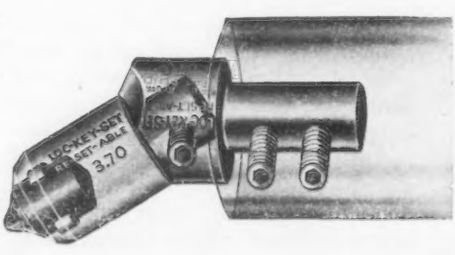


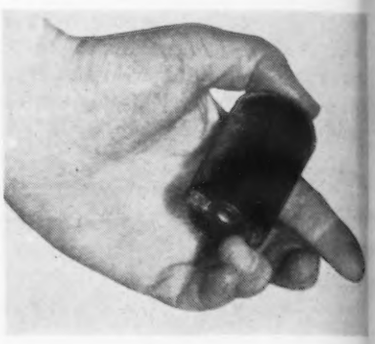
Marking Machine

THE ACROMARK CO., 341 Morrell Street, Elizabeth, N. J., has produced a new model 12B marking unit for marking items made of copper, brass or hardened steel. The machine will mark products of varied sizes and lengths with only a simple adjustment for each variation in dimension. Each unit is fed automatically from the chute to the die by a positive arrangement.

Angle Set Tool

A THIRTY degree angle-set attachment for dressing 2 in. radius from template with 3 to 4 karat common quality diamonds has been announced by *Diamond Tool Co.*, Chicago. This holder enables bullet nose grinders to use common quality diamonds to form wheels by dressing from 1 to 6 in. radius with the angle-set. The mean fixed position left or right in which the diamond nib is held prevents wear to the setting in this dressing operation and eliminates the use of thin diamonds and weak points for dressing.





Wire Brush

A SOFT rotary wire brush has been developed by the *Osborn Mfg. Co.*, 5401 Hamilton Avenue, Cleveland. This brush is used to remove insulation from very fine wires in radios and other electrical instruments. It is made of steel wire and has 240,000 wire ends on its surface. Brushes are mounted on spindles arranged so that they run parallel to clean around the wire. Each brush may be mounted on a motor, or one motor may be used for both.

For Naval Bronze

Naval Bronze File

NICHOLSON FILE CO., Providence, has announced a line of files for use on Naval bronze. The teeth of the files are shaped so that they will not dig into the metal. This results in a good finish and counteracts any tendency of the files to run off to one side. The files are available in the same types and sizes as regular purpose files.

LOOK OUT, you Axis aviators! This bomber is a hornet with a sting on every side . . . protected from attack by blistering fire poured to all points of the compass.

Protection is also important here at home. Guard your equipment and tools to save vital metals . . . cut down needless waste and we can produce more war materials. Storage batteries, for example, last longer when you follow these four simple rules. Obey them all now and you're hitting the Axis. *Buy to Last and Save to Win!*

Exide IRONCLAD BATTERIES

PROTECT YOUR BATTERIES FROM THESE FOUR ANGLES:

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Assembly Line . . . STANLEY H. BRAMS

• Output breakdown feared unless CMP procedures are modified; even quick reforms won't cover all cases . . . Smaller War Plants Corp. talks program with auto firms.

DETROIT—Crisis overhung a good share of the second quarter war production program this week as Washington sought to work out emergency measures to bring supplies to materials-hungry automotive plants. A meeting of automotive industry executives with CMP officials last week in the East produced a fairly satisfactory meeting of minds on the need for such emergency action, and the auto people are now momentarily awaiting word of the details. If they do not come through in a matter of days (there is some possibility that they will develop before this reaches print) serious curtailments in production and employment lie immediately ahead.

The Automotive Council for War Production spearheaded the auto industry presentation. Stress was laid on the belief that CMP in itself was basically sound, but that important details of its operations needed revision, and in a hurry. These four major problems were outlined:

1. Preference ratings on many orders are being split. That is, 70 per cent of an order might be given AA-1 priority, while the balance would be put on AA-3 or AA-4 priority. This, in effect, is nothing more or less than the situation prevailing under PRP. It affects no scaling down of orders to match available supplies of materials; it simply puts the manufacturer in the position of having a schedule to meet, and at the same time makes it impossible, practically speaking, to meet that portion which does not have top priority.

2. Allotments are very tardy in arriving at manufacturing companies. They are coming through so late that the chain of production planning cannot be made effective in many instances for the second quarter. The viewpoint was stressed that CMP planning should be on a long term basis, rather than from quarter to quarter.

3. Allocations of materials are unbalanced. Requested amounts of steel and aluminum, particularly, are not being scaled down evenly. Bills of materials are as correct as the auto people can make them, and if reductions in allotments of specific materials are ordered, they should be uniform, otherwise the quantity of output possible is held to the limit imposed by the most-reduced material. This actually results in the building of surplus and unusable inventories of less-curtailed materials, contrary to the entire CMP concept.

4. Work which has not yet been brought under CMP is still being handled under PRP. And orders placed via PRP with steel mills are being buried under CMP releases, in accordance with the CMP regulations, thus impairing the purchasers' chances of getting such materials in time to do any good in the second quarter.

Bolstering these contentions was a telegraphic survey of A.C.W.P. companies representing 256 plants in 27 states. Of these, 78 had not yet received any allotments. Partial allotments had been received by 86; balanced allotments were in the hands of 53; unbalanced allotments were handed to 23. Of the 256, split preference ratings had been given to 87.

JUST how the WPB will correct these problems is as yet not ascertained, although it is known that some fairly definite reforms were sketched at last week's meeting.

Certainly the changes must include some program to guarantee manufacturers still operating under PRP their required quotas of supplies during the second quarter. Certainly they must also include standardizing of operating methods on the part of all the claimant agencies; the four difficulties above enumerated are not common to all the claimant agencies. Imperatively they must speed up the handling of the applications and the allotments in Washington, for responsible industry sources maintain today that in order to insure proper time-cycling of production planning, third quarter CMP paper work should be entirely processed already, whereas the second quarter of the year is far from completely set up.

MEANWHILE, there is some considerable question in Detroit whether any reforms or changes in CMP will come in time enough to avert dislocations of both major and minor proportions in employment and production during the second quarter. Indications are that backlogs of materials now on hand and in transit, as well as supplies "owed" to producers by steel mills and other suppliers will be only a partial means of averting curtailment.

Check-up among individual companies establishes this fact rather firmly. For instance, one manufacturer of aircraft parts was cut approximately 40 per cent on his aluminum allocations, contrasted with reductions of considerably smaller quan-

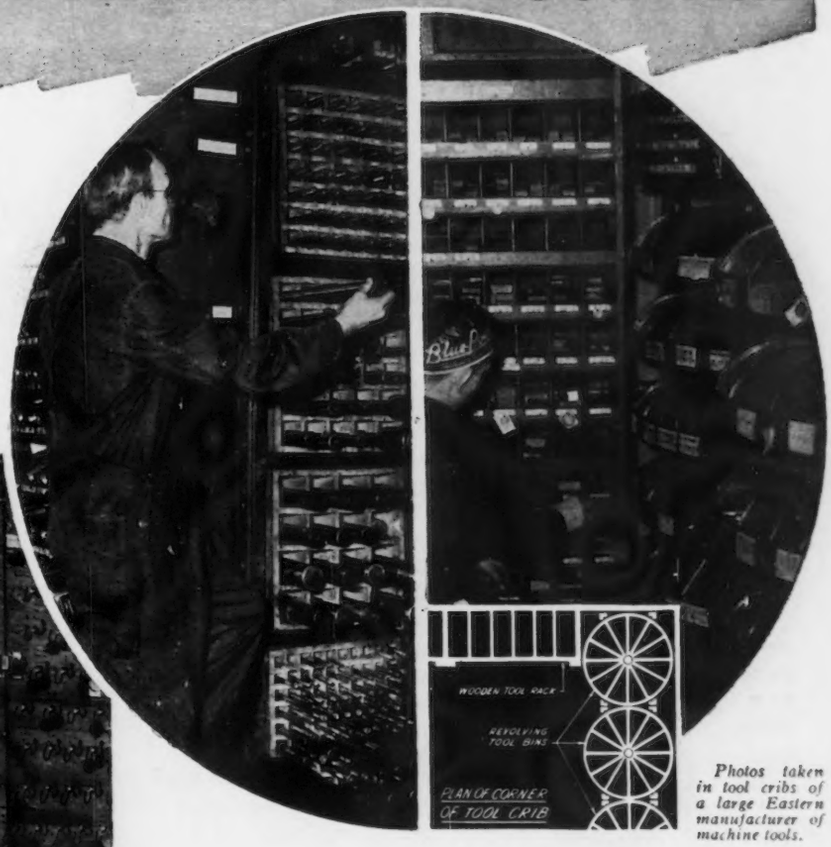
MASS SHELL PRODUCTION: Willys-Overland Motors, Inc., has produced more than one million 175 mm. artillery shells during the past 12 months. This photograph shows the rough turned shells being arranged before going into a gas fired oven for heat-treating, one of 300 operations involved in production of the shells.

Tool Conservation BEGINS IN THE TOOL CRIB

Broaches (in circle, left) that formerly took much more space when spread lengthwise on flat shelves, now fit easily into these bins. Clear visibility and convenience to the delivery window mean less waiting time for these tools

•

Revolving bins (in circle, right) make the most of every square foot of space, give ready access to their contents. Sketch indicates how former "dead corner" was saved, and space made for wooden tool racks.



Photos taken in tool cribs of a large Eastern manufacturer of machine tools.

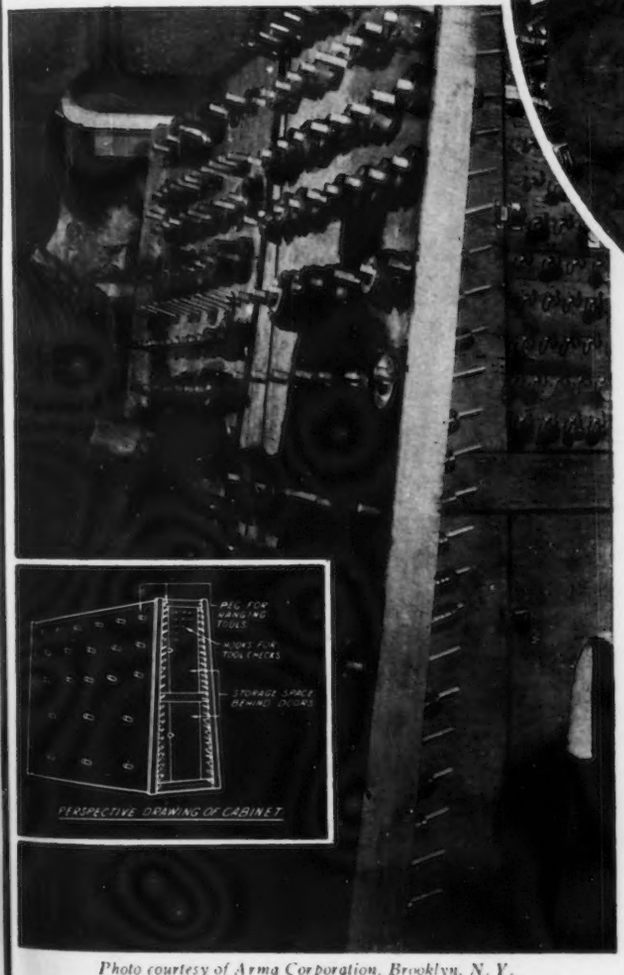


Photo courtesy of Arma Corporation, Brooklyn, N. Y.

Dead Space usually found in center of crib utilized by double deck "slanting-side" cabinet. Tools hang on sides, bulky items are stored inside. Doors are used for "in and out" tool checks.

AND Saves Space TOO!

Perhaps you've been thinking, "Yes, I'd like to plan my tool crib to take better care of my tools — but the plant can't give me more floor space."

Then you'll be interested in seeing how some plants improved their tool storage, and saved space too!

As these photographs show, space may be saved by:

1. Rearrangement of storage facilities.
2. Alteration or substitution of equipment.
3. Utilizing waste floor or wall space.

Yes, your tool crib can pay big rewards for a little careful thought.

GTD GREENFIELD

TAPS · · · DIES · · · GAGES · · · TWIST DRILLS · · SCREW PLATES

ARMY E NAVY

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASSACHUSETTS

DETROIT PLANT: 5850 Second Blvd.
WAREHOUSES in New York, Chicago and Los Angeles.
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GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

tity on his carbon and alloy steel requirements. Inasmuch as aluminum controls the production volume of this manufacturer, the comparatively large allocations of steel are of relatively minor effect.

A vehicle and aircraft manufacturer has received only two-thirds of more than a score of his applications. Only a small proportion of those obtained are in balance as regards material allotments. This particular producer will be facing very serious production difficulties as the result of the late arrival of his allotments and even if he obtains some 10,000 tons of steel on order earlier at mills, his second quarter output will be reduced by a fifth from its expectancy, and employment will be correspondingly reduced.

One producer of heavy steel products, both carbon and alloy, is fearful that he may have to reduce his working force as much as half during the second period inasmuch as his allotments are so late in appearing.

A parts producer expects that unless an almost immediate change takes place in his particular circumstances he will not be able to produce beyond April. At the time of writing he had received no allotments whatsoever on his prime contract.

A producer of military vehicle requirements anticipates that his factory may have to close down entirely early next month unless he receives his CMP ratings and allotments very promptly. This particular producer is rather optimistic on the possibility of obtaining his allotments but is worried about a possible complete tie-up on a new contract because one supplier failed to include requirements for this particular job on his CMP-4B applications. There can be no mistakes under CMP—once the wheels begin to turn, it appears, the situation is beyond salvage and beyond repair.

SEVERAL instances are found where a number of claimant agencies must pass on the same product. In one case five applications are so involved and only one allotment had been received at the time of checking. It is obviously impractical to schedule production runs on these units with four allotments missing. Furthermore, it has always been possible for producers in such circumstances to be able to adjust their schedules from time to time to keep assemblies flowing to all their outlets, meeting emergency requirements of one by diverting shipments of others. This, it appears, will not be possible with the involvement of several claimant agencies.

Wide World Photos

MINUTE CHECKUP: Inspectors check de-icing equipment on the rudder of this huge, nearly completed PBM flying boat being built for the Navy at the Martin plant near Baltimore.

An interesting situation is raised by the regulation that allotment numbers with the same preference rating must be billed according to the date received. At present a supplier, whether mill or subcontractor, must book himself up to capacity on incoming orders, then turn down additional orders. This occurrence has already taken place: two firms making similar products, one on the east coast and one on the east coast and one on the west coast, have been given allotment numbers and preference ratings by Washington on the same date. However, by the time these travel to the west coast and back again to the midwest supply sources as orders, the east coast manufacturer long since has been able to place his orders with suppliers. As long as the "date received priority" continues to prevail, west coast firms run the risk of being shut out entirely from obtaining bottleneck items from regular sources, or perhaps any sources at all. In the past, of course, such suppliers allotted their output among various customers on an informal basis and worked matters out satisfactorily.

THE Smaller War Plants Corp., having undertaken test projects in the east, is moving into the automotive plants for help in expanding its program. The SWPG hopes to utilize automotive manufacturers and others as primary contractors on jobs which would be 100 per cent subcontracted.

Planning for some such proposals is already underway. The prime contractor would receive a fixed fee for his work, and he probably would earn it. For he would have the task of supervising manufacturing and final assembly operations in plants which might be widely separated geographically and quite often not equipped to undertake the manufacture they will be attempting without a considerable amount of retooling.

The way the SWPC system has worked is that after some buying agency (or claimant agency in CMP parlance) decides on a certain job to be done, the Smaller War Plants Corp. seeks to channel that work into companies which do a relatively small percentage of the business of their industry and which classify as "distress plants," operating at no more than two-thirds of their productive average of the five pre-war years. Lists are now being prepared of such companies. Award of the contract may be made to a large prime contractor for complete sub-contracting to smaller companies, or to smaller concerns in the first place.

In the case of 100 per cent subcontracting, which would eventuate with a large prime contractor, it should be stressed that the job is being done for a specific government buying agency and not for the Smaller War Plants Corp. Accordingly, if suitable deals cannot be set up with the small companies, there is no hard and fast compunction on the prime contractor to utilize the companies recommended by the SWPC.

There is some indication that contracts placed with these small companies can be set up at prices as much as 15 per cent over going quotations for similar work undertaken in large companies. Obviously, the cost of the war goods is not so much a factor in the SWPC program as is the desire to spread work and continue the life of small companies whose existence has been impaired by the war.

Whether a 15 per cent increase over going rates for work will be enough to continue many of these plants in existence is a question, for wide inefficiencies have been found in preliminary studies. In one example, the figuring on a specific job by small concerns ranged all the way from $66 to $107.

There are probably somewhere around 4000 or 5000 companies which are listed as small "distress" plants.

A WAR-TIME ANALYSIS OF *Salvaging*

GAGES BY HARD CHROME PLATING

Why can the chrome plate salvaging of your worn gages and non-cutting precision tools further the War Effort?

LONGER LIFE: The average wear-resistance of a Lincoln Park chrome plated gage is approximately five times that of a similar gage.

SAVES STEEL—With this salvaging service available, it is not necessary to discard your worn gages and non-cutting precision tools and order new ones which require the use of critical metals. Salvaging not only conserves the steel required for original manufacture but greatly prolongs the life of that over which the plating is applied.

SAVES MAN AND MACHINE HOURS—When one gage is salvaged by chrome-plating, the manufacturing capacity required for the production of five ordinary gages is released for other vital work.

INCREASES MANUFACTURING TOLERANCES—With any gages, wear allowance must always be taken into consideration. However, when wear-resistant gages are used, it is obvious that the allowance for wear can be reduced considerably . . . automatically increasing the manufacturing tolerance. This slight extra percentage of tolerance becomes highly important when the dimensions of parts being inspected are very close to the required limits. It eliminates rejection of parts which should be accepted . . . and, in many cases, effects great savings both in expensive parts and man-hours.

Chrome plate salvaging is and has been for several years past—an important and highly specialized part of Lincoln Park's operations.

LINCOLN PARK TOOL and GAGE CO.

LINCOLN PARK, MICHIGAN

Washington . . .

L. W. MOFFETT

• Scheduling of components expected to bring new complications for industry . . . New definition of Class A and Class B products offered by Washington wag . . . Inventory inspections held necessary . . . Expansion program held up.

WASHINGTON—Although WPB Executive Vice Chairman Charles E. Wilson has said that CMP will go into effect unmodified by anything he may do about scheduling under the new order M-293, the fact that existing governmental-industrial procedure will be more complicated cannot be doubted. Some new embroidery is already being prepared in the form of instructions to each class of component producers. The instructions govern order boards, provide forms for reporting and solve jurisdictional disputes between WPB industry divisions and claimant agencies.

Order M-293, procedure for scheduling components, can be likened to the procedure employed by the WPB Steel Division in issuing production directives to the mills. The only difference will be that J. A. Krug, Materials Distribution vice chairman, will say to whom the components go.

On the non-serious side, a wag in the Steel Division whose name is withheld for obvious reasons, has summed up the feeling many manufacturers have had about Class A and B products under CMP, in a new definition, as follows:

"Class A products are not Class B products unless the Class B products are also consumed by the manufacturer who manufactures Class A in which case Class B products are considered to be Class A products and are treated accordingly. It's as simple as that!"

In steel this week, discussions have centered around plates, alloy steel distribution and steel for plant expansion. Plates, always under concentrated political pressure because perhaps government officials can visualize what they are as easily as they can visualize dinner plates, may be produced in greater volume than needed and the main reason may be this fact. The Requirements Committee which allots all steel in tonnage except plate and tinplate is said to be responsible for this condition.

IN April, for instance, plate requirements are stated to be 1,176,000 tons. The Requirements Committee will allocate and mills will roll 1,170,000 tons. Responsible officials of the WPB Steel Division say that before April is out there will be from 10,000 to 20,000 tons of plate orders which will be cancelled. The reason is said to be the overstatement of demand and some high WPB officials say that proof of the fact that too much plate is being rolled is that Requirements Committee allotments satisfy all claimant agencies—thus taking care of all demand overstatements.

Specific instances have been discovered where Maritime Commission and Navy shipyards have excessive plate inventories. Admiral Robinson is reported to have grumbled recently when WPB officials brought to his attention the fact that at that time there was seven months supply of plain plate at a prominent East Coast shipbuilding yard. The Navy, of course, has some excuse for plate hoarding because of need for repair of foreign vessels and emergency needs for United States ships.

IN the alloy field, the necessity for standardization of Army and Navy inspection procedures are being suggested by WPB. Great variation in interpretation of magnafluxing examinations is one point. While the services have certain standards for the minimum number of flaws in steel, the two do not agree to a com-

COMBINATION TRANSPORT: Henry J.Kaiser unveils a model of the combination aircraft-airplane transport on which he has begun production at his Vancouver, B. C., shipyard, expecting to complete six each month by the end of 1943. Each carrier will accommodate about two squadrons of planes. Left to right are President Roosevelt; Rear Adm. Howard L. Vickery, Maritime Commission; Mr. Kaiser; Assistant Secretary of Navy Artemus L. Gates, and Rear Adm. Emory S. Land, Maritime Commission chairman.

GEAR PRODUCTION *Shifts into High*

Photo by
...ce of War Information

SUNICUT

"permits up to 83% more tank gears cut per tool change"

Gears to drive America's steel "war horses" at break-neck speeds through sand, mud, and snow. That's the wartime job of a certain large eastern manufacturer producing gears for tanks . . . and he's doing a better job thanks in part to Sun Oil Engineers and Sunicut.

Early in the war effort this manufacturer decided his production rate had to be stepped up. He called a Sun Doctor of Industry—a metal working expert—who studied conditions and recommended a change in cutting lubricant. Sunicut, the transparent sulphurized cutting oil, was tested and adopted. Production soared! With Sunicut they are now able to cut as many as 83% more gears between tool changes.

Production increases like this are not uncommon when the exceptional metal-wetting and heat-absorbing qualities of Sunicut go to work on tough jobs. Whether you make gears or bullets or bomb fuses, if it's increased machine tool production you want, call in a Sun Doctor of Industry. His services and the products he offers are yours to use to turn out more and better war materials . . . faster. Write

SUN OIL COMPANY · ***Philadelphia***

Sun Oil Company, Ltd., Toronto and Montreal, Canada

SUNOCO

SUN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*

mon number. And, although in ordinary inspection, several inspectors may pass on the same piece of steel, it is well recognized that opinions may vary between inspectors. The adoption of standardized inspection procedure is expected to result in making available to all contractors a much wider range of material, no matter what testing method is used.

In the realm of supply, aside from ordinary effort to get open hearth production of alloys, the WPB Steel Division is requesting producers of tool steels to make alloy steel for aircraft needs. Several thousand tons a month can be secured from this source, and it is expected that the move will help materially in clearing up many thousands of small orders.

More and more it becomes evident that inventory inspection by competent inspectors is necessary, since there is no real information on the subject available in WPB. Report forms returned by producers and manufacturers are frequently processed by low paid clerks with no knowledge of the problems with which they deal, and who have little interest in accuracy.

ALLOY distribution has not been good, it has been discovered, because the Steel Division has not known what inventories were held by end product manufacturers and their sub-suppliers. Lack of knowledge of the amount of metal in semifabricated components, components in process, and raw material not in process, prevents the WPB from correctly distributing steel. Even CMP as it now stands will not remedy this defect, since Form CMP-6 has been dropped.

Consumers on the other hand are not to be blamed if they furnish misinformation because it has developed through investigation that consumers do not know their position on melt schedules until approximately the middle of the month in which the melt is made. This condition prevents consumers from making changes within the schedule so that items can be cut back which are not required for the period in question, or other items which are suddenly needed added. This could be remedied if consumers were given information as to their position on melting schedules early in the month preceding the month of melting.

Much conflicting information is circulating about WPB with respect to second quarter allocations for steel expansion. One report is that the WPB Requirements Committee is demanding that there be a re-survey of the expansion program with a view to balancing it before an allotment is made for this purpose. Other reliable sources deny that this is true, and say that an allotment has been proposed and approved, and that there is no real drive for a re-survey.

Meanwhile, the whole expansion program has been held up by special directives which have superseded preference ratings supposed to be high enough to bring the steel in by June 30. Some persons say that the program has been retarded by the special directives on 100 octane gasoline and synthetic rubber by as much as 60 days. The September, 1941, report on expansion made by W. A. Hauck, of the WPB Steel Division, said that it would be impossible to complete any expansion program within the time limit of nine months to two years unless highest priority ratings are assigned to all projects to insure deliveries of necessary materials as rapidly as needed.

"This is most essential and important as otherwise there is no use in considering a steel expansion program that will be of benefit during the emergency period," the report summed up.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THAT'S AN EIGHT, NOT A THREE! IF YOU GUYS DOWN HERE CAN'T READ BLUE-PRINTS, I'LL SEND THE OFFICE BOY DOWN!
THAT'S NO BLUE-PRINT, THAT'S A CARTOON! YOU'D BETTER CHANGE IT BEFORE SOMEBODY TAKES IT HOME TO READ TO TH' KIDS!
WHY IS IT THAT TH' MACHINE SHOP AN' DRAFTIN' OFFICE ARE ALWAYS TAKIN' A PUNCH AT EACH OTHER? LIKE A MARINE AN' SAILOR, A CAVALRYMAN AN' A DOUGHBOY, AN--
I DON'T KNOW, BUT THEM KIND STICK TOGETHER TH' BEST WHEN ANY OUTSIDER HORNS IN --THE AXIS WILL LEARN THAT!
A NATIONAL TRAIT
T. M. REG. U. S. PAT. OFF COPR. 1943 BY NEA SERVICE, INC.
J.R.WILLIAMS 3-26

New Program System On Foreign Purchases Set

Washington

• • • A new system of advance programming of exports for foreign government purchasing missions, which will make possible closer coordination in procurement and shipping, will be adopted in the near future, it was announced in a bulletin issued recently by the Board of Economic Warfare. The proposed system will provide United States exporters with advance information upon which to schedule available business in accordance with known essential requirements.

Scheduled to become effective April 1, the plan was worked out jointly among the Department of State, the Office of Lend-Lease Administration, and the BEW, in agreement with the missions. As the plan is initiated, it provides for the submission by the foreign purchasing agencies, to the Office of Lend-Lease Administration or the BEW of quarterly estimates of import requirements for territories represented by the missions.

An "unlimited" export license, which has been issued to each of five purchasing missions, will be replaced by a "program license." It will authorize release of goods on the quarterly basis.

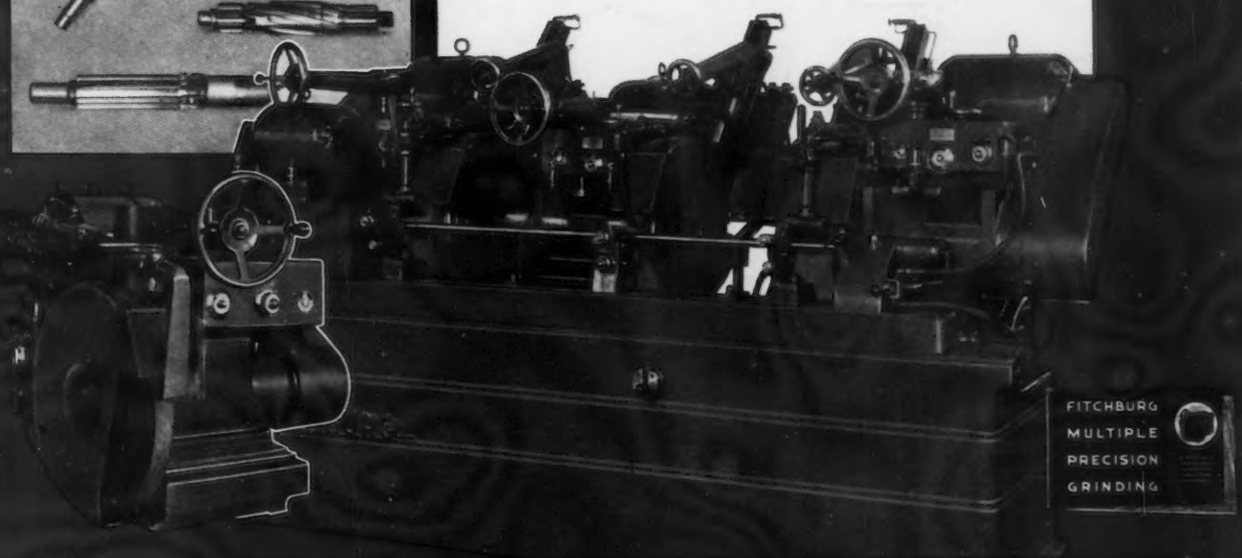
THE FITCHBURG METHOD OFFERS . . . SPECIAL MACHINES FROM STANDARD UNITS

Fitchburg automatic multiple precision grinding offers the same profit possibilities that up-to-date shops now earn with multiple tooling and combined cutting on machined work.

Special machines mounting Standard Bowgage Head Grinding Wheel units, like the one illustrated, enable the precision grinding of two or more dimensions at a single handling. Grinding is completed within the time required for the longest single operation. On mass production work these Fitchburg grinders rapidly repay their cost.

On hundreds of parts like those shown, for machine, automotive or ordinance work, Fitchburg engineers can help you to make sure your orders are filled on time, and at the lowest possible cost. It will not obligate you to mail in your blueprints for study. Catalog shows wide range of other successful applications. Write for a copy today on your business letterhead.

When installing special grinding equipment it is important to remember that the Fitchburg Bowgage Grinding Wheelhead is a self-contained standard unit. It can be remounted on standard machines, or on new special bases, for operations other than the one originally specified. This feature protects your investment.



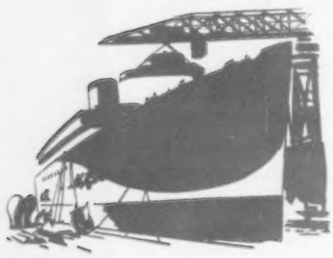
FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U. S. A.

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders

WEST COAST . . . OSGOOD MURDOCK

• WPB, OPA file charges against essential war producers . . . Los Angeles scrap yards curtail activity . . . Tin can supply for copper precipitation further threatened . . . Douglas profits decline.



LOS ANGELES—Like a small boy waiting at a blind intersection to see the inevitable crash, the West Coast last week held its breath and closed its eyes as OPA and WPB regulations met head-on with two firms whose activities could not be curtailed without hurting the war effort.

L'affaire Kaiser is the first of its kind in which the WPB has tangled with this industrial hero, although he had a previous encounter with the OPA.

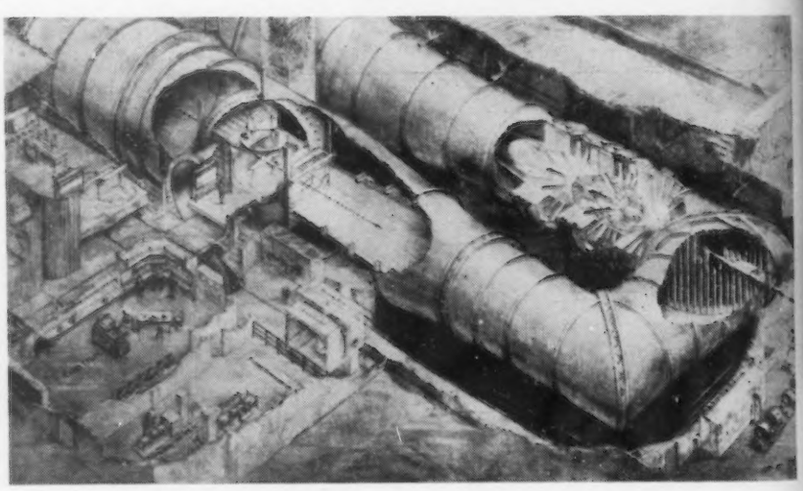
Hardly an industrialist in the land has slipped a PRP authorization out of its envelope to find his requests severely slashed without wondering just what would happen and whether anyone would find out if he should secure excessive deliveries, provided the verboten materials were put to good use. Most purchasing agents of firms fondly classified by the political errand boys as "little business" have resisted the temptation to find out. Thus far, WPB has issued several score suspension orders penalizing just such derelictions, no matter how worthy the intent of the transgressor. A suspension order means that a firm is put out of business for a period of time, sometimes 90 days, sometimes for the duration, but always enough to practically nullify the chances of again reaching full business activity for sometime.

Henry J. Kaiser can't very well be slapped out of business for six months by a WPB suspension order, though, and both he and the WPB are familiar with this fact. This is axiomatic, notwithstanding WPB charges that receipts by the Richmond, Cal., No. 3 shipyard which Kaiser is operating for the Maritime Commission exceeded PRP authorizations. The No. 3 shipyard of Kaiser Co., Inc., is regarded as the crown prince of the Kaiser dynasty, for along with the Permanente Canyon magnesium plant and the Fontana steel plant, the Kaiser family anticipates that it will continue operations through thick and thin after the war, as compared with other shipbuilding and light metal units being operated for the government on a fee basis which will probably fold up when the last gun is fired. The No. 3 yard currently is working on Navy contracts, whereas the Richmond yards Nos. 1 and 2 have been record breakers for the Maritime Commission.

THE 31 instances in which No. 3 allegedly violated PRP occurred over a period of six months. Mr. Kaiser calculated that the average number of violations per month was five-plus, which he asserted was pretty good slugging considering that the Kaiser shipyard string builds 60 ships a month, each ship comprising 9000 groups of items.

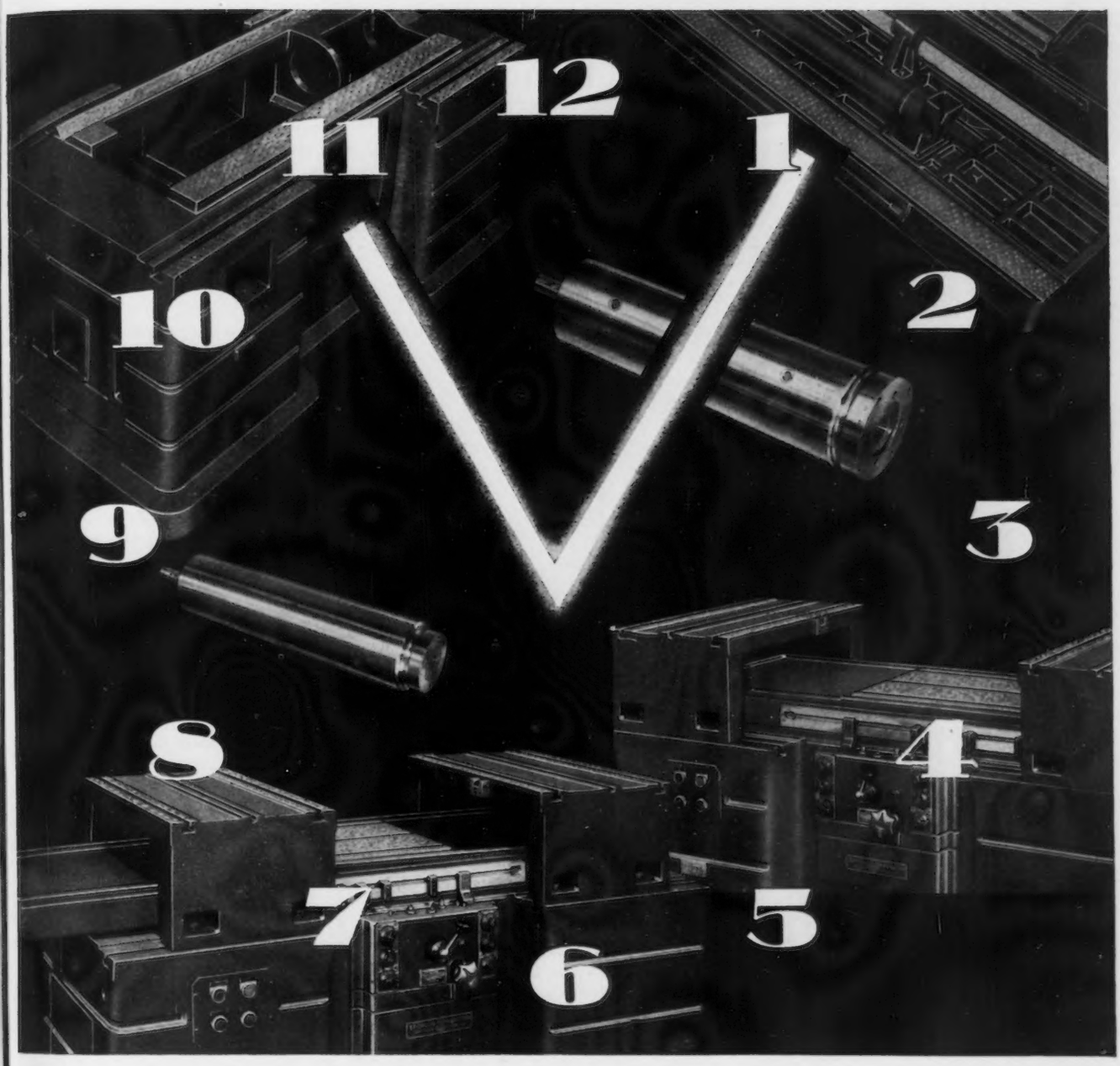
Among the 31 items (of the 3,240,000) overlooked by Mr. Kaiser's men, but not the WPB were such items listed by WPB as 32,037 tons of carbon and alloy steel; 1178 tons of iron pipe; 167 tons of steel rivets; 323 tons of copper sheet and electric motors valued at $2,713,744.

Certain factors in the case are fundamental: (1) The charges involve a single unit in the vast Kaiser string and do not reflect upon the ethics or practices of the other members. (2) Although the alleged excess receipts occurred under PRP, they could just as well have occurred under CMP, or as conflicts with inventory restrictions of the old original priorities system—the merits or demerits of PRP as a method of distributing materials are not involved in any way. (3) A "shutdown" or suspension order cannot possibly be issued against an important producer of war materials, but WPB has never invoked the section of the Second War Powers Act which makes possible heavy fine or imprisonment for violators of priorities regulation. This case might be the first time; or, if the violations are not regarded as



Wide World Photo

COOPERATIVE WIND TUNNEL: The most advanced wind tunnel ever built is the claim of the Aircraft War Production Council for the new aeronautical designing project begun at Pasadena, Cal., recently. Costing approximately $2,100,000, the tunnel, to be used for testing warplanes, is being financed by Consolidated, Douglas, Lockheed and North American aircraft companies.

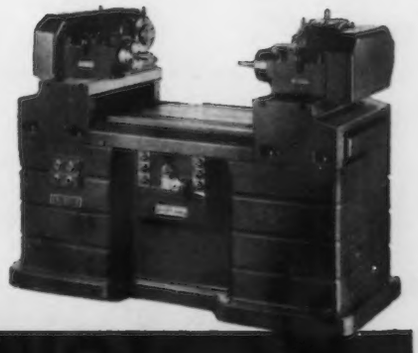


BUILT FOR 24-HOUR SERVICE!

The Ex-Cell-O Precision Boring Machine is designed and built to "take it", every hour of the day, every day of the week. Moving parts, such as spingles, drive units, braking equipment, are located on bridges above the work table. These bridges, coupled with heavy base and reinforced table, provide a precision machine that is exceptionally solid and firm. Boring units are easily accessible so that adjustments and changes are a simple matter for the operator. The Ex-Cell-O name on a precision boring machine means not only a precision-built machine to do precision work, but a machine tool that gives the utmost in efficiency with a minimum in maintenance attention.

EX-CELL-O CORPORATION • DETROIT

Below: No. 215-A—one of nine different styles of Ex-Cell-O Precision Boring Machines . . . for boring, turning, facing.



XLO

EX-CELL-O *means* PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS

willful but merely as sheer carelessness, a promise to reform might suffice.

At Washington, Mr. Kaiser told reporters, "I want it to be clear, that I am not blaming Mr. Nelson or Mr. Wilson [Charles E. Wilson, executive vice chairman of WPB]. They are clean men. They stand for free enterprise, and I am sure they had nothing to do with the charges."

Underlings of WPB, he complained, always have handicapped him. "When we protested," he said, "they told us that we didn't need preferences because we were resourceful and would do our work without help."

IN a completely different field and for completely different reasons, charges were brought last week by the Office of Price Administration against the California Scrap Iron Corp., Oakland, Cal., for alleged violation of price ceilings. Proportionately, this case has as many elements of an irresistible force versus an immovable object as the Kaiser case, for this firm generally has been regarded as the bellwether of the San Francisco Bay area scrap trade. Repeated praise has been drawn from the War Production Board for cooperation in salvage programs, and Marshall Shapiro, president, is a member of the iron and steel scrap sub-committee of the Waste Materials Dealers Industry Advisory Committee to the War Production Board. Uncle Sam even has put up some money for expansion of the yard's operation. Scrap processing facilities are scarce in the Bay area, and the OPA obviously can't afford to close the company's gates. A stiff fine might impair the firm's ability to operate.

If the WPB and OPA, respectively, can wind up these two cases without backing down or hurting the war effort, the State Department has some promising material on this Coast.

ALL business strata of the scrap trade who depend on collections over large geographical areas are still fretful over OPA regulations. A difficult labor situation, coupled with lack of clarity in OPA regulations have made portions of the southern California trade slow down operations considerably.

One principal factor here declares that collections have dropped off 50 per cent from the peak reached during WPB drives last fall. "I look forward to a serious shortage in three or four months," he declares, and adds that scrap produced locally is insufficient to meet needs in this district. Restricted operations by auto wreckers, from whom 60 to 65 per cent of local scrap normally originates, has resulted from labor shortages.

On the other hand, WPB salvage representatives in southern California contend that the district will be well supplied for four or five months, with mills building substantial stockpiles. It is admitted that dealers' yards are low, but the general comfortable situation precludes concern.

The most gloomy situation still lies in securing sufficient tin cans to be processed for use in precipitating copper bearing waters at the mines. Despite a WPB regulation prohibiting shipment of cans, tinned or detinned, to steel mills, the OPA still insists that they are scrap steel and that scrap steel ceiling prices must apply. A $13.35 ceiling is constantly doing battle with soaring production costs to discourage can collections from high cost remote areas. Because of the necessity of shipping the cans loose, rather than compressed, as is the case with steel-making scrap, freight costs over long distances rapidly become prohibitive. As the situation stands now, the copper mines will go begging unless some price adjustments are given the can processors by OPA.

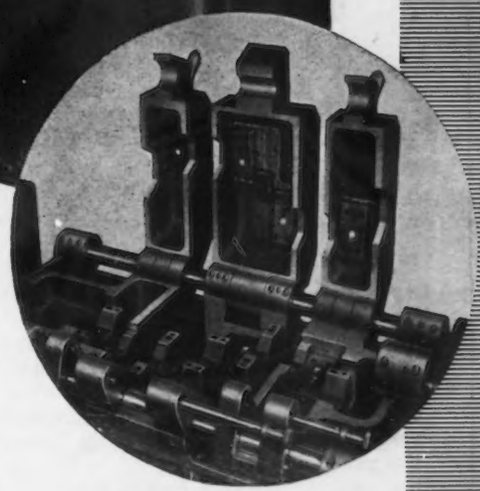
ALTHOUGH Douglas Aircraft Co., Inc., built more airplanes during the fiscal year ending Nov. 30, 1942, than during its combined previous years of existence, earnings dropped nearly 40 per cent, the annual report released to stockholders last week showed. Net sales during the fiscal period rose to $501,781,984 from $180,940,110 in the year ended Nov. 30, 1941, a gain of 177 per cent. The margin of net profit set for the year was 2.2 per cent.

TOM M. GIRDLER, who a few years ago found the steel industry sufficiently challenging to occupy his time, last week took his place as chairman of the board of one of the largest aircraft manufacturers in the world, the Consolidated Vultee Aircraft Corp. The huge new firm was created, as expected, by vote of stockholders of Consolidated Aircraft Corp. and Vultee Aircraft Co. Eleven plants formerly operated by the two firms will be combined under the management of one integrated company.

The eleven plant divisions include the Consolidated San Diego and Fort Worth plants as well as the recently acquired former Nash-Kelvinator plant at New Orleans; modification centers at Tucson, Ariz., and Elizabeth City, N. C.; Vultee plants near Los Angeles and at Nashville, Tenn.; the Stinson division at Wayne, Mich.; a new plant at Allentown, Pa.; a modification center at Louisville; and Intercontinent Aircraft Corp., a subsidiary, at Miami, Fla. The recently announced Stout Research Division of Consolidated is at Dearborn, Mich.

MARINE LANDING: The marines have landed, new style. Combat troops are unloading an anti-tank gun from a transport plane.

10-MINUTE ASSEMBLY JOB CUT TO 2½ MINUTES



This 20-ton Denison horizontal press is doing in 2½ minutes a job that formerly required ten . . . the assembly and disassembly of airplane engine crankshafts.

War-rushed plants all over the country are getting help like this from Denison HydrOILics. And this application is only one example of the wide flexibility and ever increasing range of oil hydraulics. In this case, it eliminates tedious, painstaking hand effort and saves valuable time and labor.

The crankshaft is locked in the fixture in three sections, with the center section held rigidly in place and the two end sections remaining movable. Operation of the selector valve directs the hydraulic fluid to either the right or left hand ram. Movement of the ram-operating lever moves the sliding section of the fixture, and assembles the splined external and internal parts of the shaft. The operator then shifts the selector valve, applying pressure to the opposite ram and repeating the operation on the other end of the crankshaft.

This is oil hydraulics at its best . . . speeding war production of critical parts. In almost every industry, Denison HydrOILics is stepping up efficiency, saving materials, eliminating operations, doing jobs faster and better at lower cost.

To find out where Denison HydrOILics can help you, call your Denison representative or write directly to the factory. The Denison Engineering Company, 1158 Dublin Road, Columbus, Ohio.

SPECIFICATIONS

Maximum Stroke, each cylinder	4"
Maximum lateral opening	25"
Size of machined bolster	22"x44"
Depth of throat from center of rams	7" ± .005
Cylinder diameter	6"
Ram diameter	3"
Floor space	28"x93"

Helpful Literature!

A 28-page catalog illustrating Denison standard and special HydrOILic presses and their applications to production problems. Catalog contains a special 12-page section of valuable engineering data and tables. Write for your copy today! On your business letterhead, please.

DENISON EQUIPMENT in APPLIED HydrOILics

Fatigue Cracks BY A. H. DIX

Kind Words Jack Up Plane Output

• • • Frequent inspection tours of the British aircraft plants by R.A.F. flyers help keep production high, we were told by Colonel Llewellyn, Washington representative of the British Ministry of Supply. Work isn't stopped. No elaborate ceremonies. The airmen simply stroll through the shops saying, "Jolly fine ship you make here. Highly useful to us fellows, I can tell you. Keep up the good work."

But for every aircraft assembly plant there are thousands making materials and parts. What about them? we asked. "One thing we do is to take an old omnibus," he said. "We rip out the seats, install a display of the parts and materials, and alongside we either exhibit the complete assembly or show a big photograph of the plane, tank, or whatever else, indicating in color just where the part or material is used. The omnibus travels from plant to plant. Very successful."

An idea that flourishes in English soil might languish in ours, and vice versa, owing to differences in distances and national temperaments, but the craving to find out how the product of their hands is used and what kind of a job it is doing is universal among men.

Maybe the people who make parts for the Norden bombsight and a few other heavily hush-hush items would be forbidden from showing a diagram with a big red arrow pointing to the spot where the Glutz locknut is used. But these cases are exceptional. Most plants can get a quick and positive pick-up in morale by feeding their people facts about what happens to the product after it leaves the factory.

Hyphen Haze

• • • We are hazy about hyphens, and didn't know whether to write "pick-up," "pickup," or "pick up" a couple of lines above. The rules change so fast we can't keep up with them. Years ago there was literally a diarrhoea of hyphens. They were introduced upon the slightest excuse, as if there were a fear that the reader would fail to grasp the kinship between one word and the next. This was carried so far that even "st." and the name of the street were joined in holy wedlock, as, for example, "Genesee-st." New York used to be written "New-York."

And now the pendulum is swinging to the other extreme. The bee has been put on the hyphen, and it is being considered stylish to leave it out. Take, for example, the phrase "high sulphur bearing scrap" in last week's issue. It seems to us that "sulphur-bearing" would contribute to clarity.

But we give thanks that the brains department still sticks to "infra-red." Whenever we see it written "infrared," we always mentally pronounce it to rhyme with "declared," and have to go over it again. Something ought to be done, too, with "unco-operative." Here the hyphen could well be dropped altogether, for we can never see the word without feelings that the next words will be "It seems there were two Scotchmen."

Stopper

• • • What's the hottest spot in a Dog Fight?—*Carborundum.*

Aptronyms

• • • Ralph H. Sweetser writes, "Alfred Heller runs a heat treating shop near the Brooklyn Bridge. Is this an aptronym?" Not 'arf.

A genuine aptronym is Ernest Thum's discovery that a Washington, D. C., consulting engineer is named B. P. Planner.

Melting Pot Note

While waiting in Consolidated Aircraft's office I heard the following paged over that company's public address system: Al J. Ek, Orville Godbehere, John Drzewieski, and O. Wing Hoo. I thought you would be interested in these tongue twisters.

—*R. Raymond Kay*

Three tongue and one tong twisters.

Professor's Blind Spot

• • • A higher educator's very detachment from the hurly burly of competitive existence should aid him we think, in considering practically any subject in the light of pure, cold logic. He should be fair and dispassionate, like Edward G. Robinson in "Dr. Ehrlich's Magic Bullet," and display a scientist's contempt for prejudice or shoddy thinking.

Which is why we are shocked to find Professor Coiston Warne, who advocates fastening certain leg chains on advertising for the duration, advancing a premise that would earn him a failure mark in elementary psychology. All this is probably very boring to you, and our only excuse for bringing it up is our own interest in it. Professor Warne says:

> **From the point of view of an individual advertiser, it is essential that he keep on advertising. If he stops advertising, the capital in his trade-name may be impaired or lost. But this is so only as long as his competitors keep on advertising.**

"The capital in his trade-name" is a long way of saying goodwill, and goodwill is nothing but a favorable impression. The advertiser is addressing a parade, not a fixed audience. Resignations, promotions, age and economic changes, and death are continually removing those upon whom a favorable impression has been made. Their places are taken by others upon whom no impression has been made.

Therefore, the Professor can no more "fix" goodwill than he can slow down the hardening of his arteries by neglecting to wind his wristwatch. He overlooks, too, another tremendously important factor: the new entry into the market. Many manufacturers of war goods have a product well beyond the drawing board stage, ready to spring when peace is imminent. If A, B and C let their goodwill run to seed, D, E, and F, the newcomers, will be sitting pretty.

Anyway, that's how it looks to our biased eyes.

Surprise

• • • Lieut. Gen. Somervell says that when he attended the Casablanca conference he and some others took a side trip to Palestine, and while there visited an ancient cathedral, which is so divided as to serve four faiths—Greek Catholic, Roman Catholic, Coptic, and one other which we forget. The solemnity of the scene and the antiquity of the building impressed him greatly, and a short, stout monk, who was in deep meditation in the Roman Catholic section, fitted neatly into the picture. When the entrance of the party brought the monk out of his reverie, he jumped up, stuck out his hand and said, "I'm Jones, from Emporia, Kansas."

Puzzles

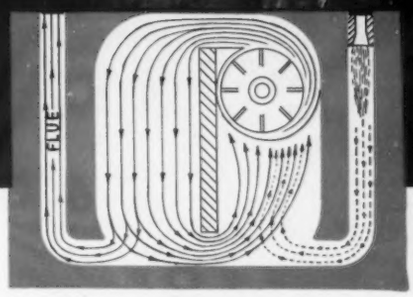
Last week's cards are arranged in this order: Ace, Q, 2, 8, 3, J, 4, 9, 5, K, 6, 10, 7.

If you can get this in two minutes add "M.M." to your name, for "Master Mind:"

Two pedestrians walk along the same road in the same direction. A walks at 4 miles per hour. He starts out 8 miles in advance of B, who walks at 6 m.p.h. As they start, A's dog leaves his master and sets off for B at 15 m.p.h. As soon as he reaches B he returns at once to A, and continues to run back and forth until the second man overtakes the first. How far did the dog travel?

A production row of Cyclones for precision tempering and wide variety of work

HOW TO CONTROL YOUR TEMPER to ±1 Rockwell "C"



This is how the Cyclone heats your work with rapid uniformity.

And we mean it, both ways. You can relax the frown and be assured of meeting the toughest Army or Navy "specs" the day your Cyclone moves in.

The Cyclone Tempering Furnace employs 100% forced convection for rapid uniform heating of the work, with a temperature accuracy that enables you to control the temper of the hardest job, whether it is a dense load of ¼" washers or a 50 pound die. The reliability of this ruggedly built tempering furnace, with its laboratory accuracy, has been proved through its country-wide use on hundreds of 24 hour-a-day production lines. It's a leader and performs like one. In the days to come, the desirable economy and precision performance of the Cyclone will repeatedly indicate a wise choice.

NO SECRETS WITHHELD— There is no secret about this weapon which is used for combating production jams, costly maintenance, delayed production and uncertain hardness readings. It is available in a wide range of sizes in vertical and box type designs, both fuel fired and electrically heated. But you can see pictures of all its features, and read about its advantages at your leisure . . . write today for Bulletin 53 on the gas fired Cyclone Furnace and Bulletin 13 on the electrically heated Cyclone.

LINDBERG ENGINEERING COMPANY
2452 West Hubbard Street • Chicago

LINDBERG FURNACES

ARMY E NAVY

SUPER-CYCLONE FOR HARDENING, NORMALIZING, ANNEALING, TEMPERING
CYCLONE FOR ACCURATE, LOW-COST TEMPERING AND NITRIDING
HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

Dear Editor:

BAND FILING

Sir:

In regard to your article on "Finishing Metals by Band Filing," in your March 4 issue, I would like a little more information on the subject. Would it be possible to know more about the cost and delivery? What arrangements can be made for a demonstration?

R. A. OLSEN,
Capt., Ord. Dept. Asst.
Springfield Armory,
Springfield, Mass.

• The author of the article, H. J. Chamberland of Continental Machines, Inc., is a resident of Springfield. We are asking him to get in touch with you.—Ed.

ELECTRIC SMELTING

Sir:

I read the article in your Dec. 3 and 10 issues on the smelting of iron ores electrically. Is such smelting being carried on in the U.S.A.?

W. H. NORWOOD
St. John's, Newfoundland

• No.—Ed.

GLASS GAGES

Sir:

A few weeks ago you had an interesting article on the use of glass for precision gages. We use a great many gages in our work and are most anxious to try some of the glass gages. If possible, please let us know which of the principal gage companies are now offering these gages as we want to buy a few for trial.

C. F. CARPENTER,
Purchasing Agent
Stapling Machines Co.,
Rockaway, N. J.

• We understand that all the principal gage makers are now in a position to furnish glass gages to blueprint specifications. If you wish to obtain glass blanks from which gages might be ground in your own tool room you might write to the following glass companies: Corning Glass Works, Corning, N. Y.; P. C. Wheaton Co., Millville, N. J.; Blue Ridge Glass Co., Nicholas Bldg., Toledo, Ohio; A. H. Heisey, Newark, Ohio.—Ed.

Sir:

We would appreciate receiving a copy of your very valuable article on the use of glass gages, which was successfully demonstrated at the Frankford Arsenal, Philadelphia.

W. J. McCOY,
Purchasing Agent
Chicago Screw Co.,
1026 So. Homan Ave.,
Chicago, Ill.

Sir:

It would be appreciated if you could arrange to send to this Bureau for the attention of the Plastics Section, six copies of your reprint from THE IRON AGE of Feb. 4 entitled "Glass Gages" by F. J. Oliver, Technical Editor.

W. H. P. BLANDY,
Rear Admiral, U.S.N.,
Chief of Bureau of Ordnance
Washington, D. C.

TEMPIL STICKS

Sir:

Where can we get some Tempil Sticks or Cones to be used as temperature indicators on a heat treating bath?

EDW. F. SCHWEICH,
Secy.
Lewin-Mathes Co.,
Chouteau Ave. & 12th St.,
St. Louis, Mo.

• From the Tempil Corp., 132 W. 22nd St., New York.—Ed.

WASTE LIGHT

Sir:

I was interested in an article entitled "Salvaging Waste Light" in your issue of Oct. 15, 1942. We have been thinking on similar lines here, and would be extremely grateful if you would ask the Illuminating Engineering Society to let us have a copy of the paper by Arthur A. Brainerd and Robert A. Massey, which is summarized in your article. Unfortunately, we have not the address of this Society.

In conclusion, we would say that the information obtained from your Journal has been of great help to the writer on many occasions, and we have frequently contacted manufacturers through its medium to our mutual advantage.

A. N. IRENS,
Chief Electrical Engineer
Bristol Aeroplane Co., Ltd.,
Bristol, England

• The address of the Illuminating Engineering Society is 51 Madison Ave., New York. We have obtained a reprint of the paper for you and are mailing it.—Ed.

PICKLE LIQUOR

Sir:

I am informed by the National Bureau of Standards that about two or three years ago an article appeared in THE IRON AGE regarding the conversion of waste pickle liquor into a useful product.

I am wondering if the text of this article would be available.

LOUIS D. HUDOR
Sorel Industries, Ltd.,
Quebec, Canada

• See Sept. 8 and 22, 1938, issues of THE IRON AGE.—Ed.

BLACK LIGHT

Sir:

Will you kindly send us a clipping of "Detecting Cracks with Black Light" on page 69 of your Nov. 26 issue, also "Detecting Surface Flaws in Ferrous and Non-Magnetic Materials" on page 56 of the Dec. 17 issue.

S. R. CONWELL,
Chief Inspector
Guide Lamp Div.,
General Motors Corp.,
Anderson, Ind.

TOOL STEEL DIRECTORY

Sir:

Do you still print the book, "Directory of Tool Steels" by T. W. Lippert?

I am in a class of "Strength of Materials" with about thirty other apprentice toolmakers and this book will help us a lot.

JACK HOFER
1013 Illsley Drive,
Ft. Wayne, Ind.

• Yes, we still print it. The price is 25c.—Ed.

INCREASING CUTTING TOOL LIFE

Sir:

Please forward me abous six copies of your pamphlet entitled "How To Increase Cutting Tool Life," if you have them available.

E. F. POYNTER,
Asst. Shop Supt.
U. S. Navy Yard,
Boston, Mass.

• The latest edition of this booklet is entitled, "How To Make Cutting Tools Last Longer." It is larger than its predecessors, and now totals 51 pages. The price is 35c., in stamps or coin. —Ed.

MARTEMPERING

Sir:

Will you kindly forward four copies of the article "Martempering" by B. F. Shepherd, Chief Metallurgist of the Ingersoll Rand Co.

R. SERGESON,
Chief Metallurgist
Crucible Steel Co. of America,
Park Works,
Pittsburgh

RADIOGRAPHIC TESTING

Sir:

Could I get a copy of the article by St. John and Isenburger, "Radiographic Testing of Die Cast Test Bars" in your issue of April 17, 1930?

THEODORE W. FRANKS
424 Oakdale Ave.,
Chicago, Ill.

• Sorry but we have no more copies of this issue. It doubtless can be found in the Chicago Public Library's bound volumes. If a photostat is wanted, very likely the Library can supply it.—Ed.

How the *Airless* WHEELABRATOR *is Setting the Pace* in Metal Cleaning Production

RECENTLY a U. S. battleship slid down the ways seven months ahead of schedule . . . a superb accomplishment! But it would not have happened if materials and equipment had not arrived on time to meet the fast-moving construction schedule. The same is true of all war production.

Since castings and forgings are so vitally important in the war effort . . . and since the big portion of the nation's foundries and forge shops use Wheelabrator speed-cleaning equipment . . . it might be helpful to you, in making future plans, if the value of this process in speeding up production were related by actual users engaged in war work.

For that reason, we have asked a representative group of customers to comment on this point. Quotations from typical replies are shown on this page.

★

An Aircraft Engine Co.: "It would be impossible to get along without Wheelabrator. Using other types of equipment would require at least ten times the floor space."

★

An Electric Mfg. Co.: "Our Wheelabrators are absolutely essential to our War Production Effort. Numerous parts used on Ship Propulsion Controls are cleaned on this machine, saving considerable time over previous methods."

★

A Large Bearing Mfg. Co.: "Your Wheelabrator equipment has increased production speed at our plant approximately 100% over previous methods and is very essential to our war production."

★

A Pennsylvania Brass Foundry: "Wheelabrator has increased production speed over our previous method approximately 300%."

★

A New York Mfg. Co.: "Wheelabrators have reduced our cleaning time approximately 25% over sandblasting or pickling."

★

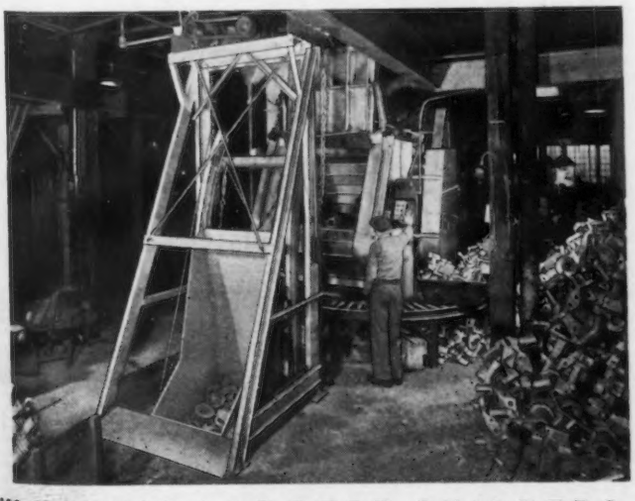
A Pennsylvania Steel Plant: "Since we have started to use Wheelabrators, in many cases our production has increased 100%, in other cases we have no way of determining to what extent production is increased, as we have no experience in using other methods. The reports from other operations show increase in production from 75 to 80%."

★

An Ohio Foundry: "We have increased our tonnage from 10,000 lbs. to 30,000 lbs. or more per day, and the Wheelabrators have been doing a fine job for us. Since using Wheelabrators, we have increased production 300%."

★

A Steel Foundry in Wisconsin: "We estimate that the Wheelabrator has increased our production as much as 60% over previous methods."



New! We also offer a complete line of equipment for the washing of metal parts, stampings and screw machine products.

WRITE FOR BULLETIN NO. 9

TRADE MARK
THE AMERICAN MOLDER
REG. U. S. PAT. OFF.

AMERICAN FOUNDRY EQUIPMENT CO.

Blast Cleaning and Dust Control Engineers

510 S. BYRKIT STREET, MISHAWAKA, IND.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

This Industrial Week . . .

- **March Ingot Output Very Strong**
- **High Pressure Steel Campaign On**
- **48-Hr. Week Trend Already Started**
- **Certain Ordnance Contracts Cut**

STEEL ingot production this month is shattering all records for March, and represents the opening of a high pressure Spring campaign that will exceed all previous industry achievements in its intensity.

This week, ingot output is steady at 100 per cent for the fifth consecutive week. March tonnage will be close to the all-time monthly record production of last October and will be considerably ahead of March last year, when operations averaged only 98 per cent on a lower total capacity basis.

Steel production, unless unforeseen circumstances arise, will continue to make new records as the year progresses. Raw material problems are not grave at the moment and steel mill maintenance programs are reported to be under control. Even should there be a slackening in new business in April from the high order volume of March, no special immediate significance would be attached to the decline.

Presidential intervention in the deadlock between John L. Lewis and the soft coal operators received the hearty approval of the steel industry. Coal stocks in some sections of the nation have been ragged. A strike would quickly hit blast furnaces operating on beehive coke, and perhaps some steam railroads.

The 48-hr. week proposed for the steel industry by labor officials is understood to have the personal approval of executives in the WPB Steel Division, although no such formal announcement has been made. The point of contention is time-and-a-half overtime. Some WPB officials have said that while time-and-a-half will not injure large steel units, it might endanger small producers unless they could obtain permission to charge higher prices.

ACTUALLY, the trend to the 48-hr. week has already started in the steel industry but the speed of the change has been slowed by difficulties encountered in balancing work crews and establishing new schedules. One large company reports that 60 per cent of its workmen at open hearths already are on the 48-hr. week.

Cutbacks in ordnance contracts have been made recently. Temporarily at least, a few types of war equipment are overabundant in this country, a situation which may be reflected in the reversing of employment trends in certain areas, with workers being shunted back to industries which they left not long ago. Also, perhaps certain restrictions placed on the making of essential civilian items may be relaxed for a period of time.

Subject to change (many changes occurred in the first quarter) tin mill requirements for the second quarter have been set at 675,900 tons, with 592,900 tons of that amount earmarked for domestic use and the balance for export. Of the domestic tonnage, 543,000 tons is scheduled for packing food and 49,000 tons for non-food purposes. Of the tonnage slated for food in the second quarter, it is estimated that 484,300 tons will be for cans, 17,100 tons for commercial closures, 22,600 tons for home closures and 19,000 tons for Canadian requirements.

The fire which flared last week over the Controlled Materials Plan can be expected to break out at intervals until CMP is operating more smoothly. Progress already has been made in straightening out the problems which the Automotive Council for War Production itemized, but new troubles undoubtedly will appear. Furthermore, CMP is scheduled to be applied to materials other than steel, copper and aluminum and to effect nations allied with the United States.

WHETHER the reforms will come in time to avert dislocations at Detroit is questioned. The lack of balance under CMP as it is operating now was one of the key points brought out by the Automotive Council. Previous to the attack on the plan, there were indications that Washington authorities were worried about this problem, and late last week it became clear that efforts would be made to protect the welfare of the civilian population by possible easing of the tight CMP controls in this respect and through simplified designs for consumer goods.

In the flood of CMP orders which has deluged the steel industry and nearly filled its schedules, numerous instances have been uncovered where consumers requested earlier delivery than they are allowed by CMP regulations. Also, warning was served on Monday by WPB that serious impairment of the scheduled flow of vital materials under CMP is threatened by the practice of some firms of placing more than one order for aluminum, copper or steel. To halt this practice WPB issued an interpretation of CMP Regulation No. 1.

Despite the fact the iron and steel scrap supply situation has dropped out of the headlines, veterans of the scrap market are watching shipments and inventories closely. Numerous factors, single or in combination, might quickly cause the re-occurrence of an emergency. Stocks in certain important consuming areas probably never will be rebuilt to a real comfortable level as long as the war lasts, according to many buyers in those territories who are bringing materials

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long distances and using all their ingenuity to maintain a decent daily flow to their scrap hungry furnaces.

USE of alloy turnings scrap still remains a problem, despite the fact the government has ordered steel companies to melt an amount comparable to 8 per cent of their alloy steel output. Some large alloy steel producers have been using over 15 per cent regularly. The production of alloy pig iron is gaining favor among producers, since blast furnaces can handle turnings in large quantities and also take care of the sulphur that the turnings accumulate from cutting oils in machining.

The WPB Steel Division publicly admitted last week that alloy steels constitute a bottleneck, with forging quality carbon steels. New melting facilities for alloy steel production have been slow to come into operation, due to low-rated priorities and other factors. Practically all important alloy steel applications require hot topping, with the result that steel companies still are faced with many difficult problems. Furthermore, the capacity of blooming and slabbing mills constitute a limiting factor, determining whether the goals now set for alloy steel production during 1943 can be met. It is estimated that for every ton of alloy steel passing through the blooming mills, at least one and a half tons of ordinary carbon steel is displaced because of the necessary increase in blooming mill time when working on alloy steel.

Despite very heavy ice fields in the upper Great Lakes areas, shippers feel that the first week in April will see the opening up of lake traffic. At Cincinnati this week, the rampaging Ohio River curtailed production in many Ohio plants. In New England, the reduced gasoline ration threatened to create new problems in the transportation of war workers to their jobs.

Pig iron orders for April are reported up from March allocations between 5 and 10 per cent. This brings to a halt the general downward trend in iron requirements that started early in December, believed to be the result of consumers making an effort to clean up stocks of iron that were on hand. A number of stacks may be forced to embark on repair programs which long have been delayed.

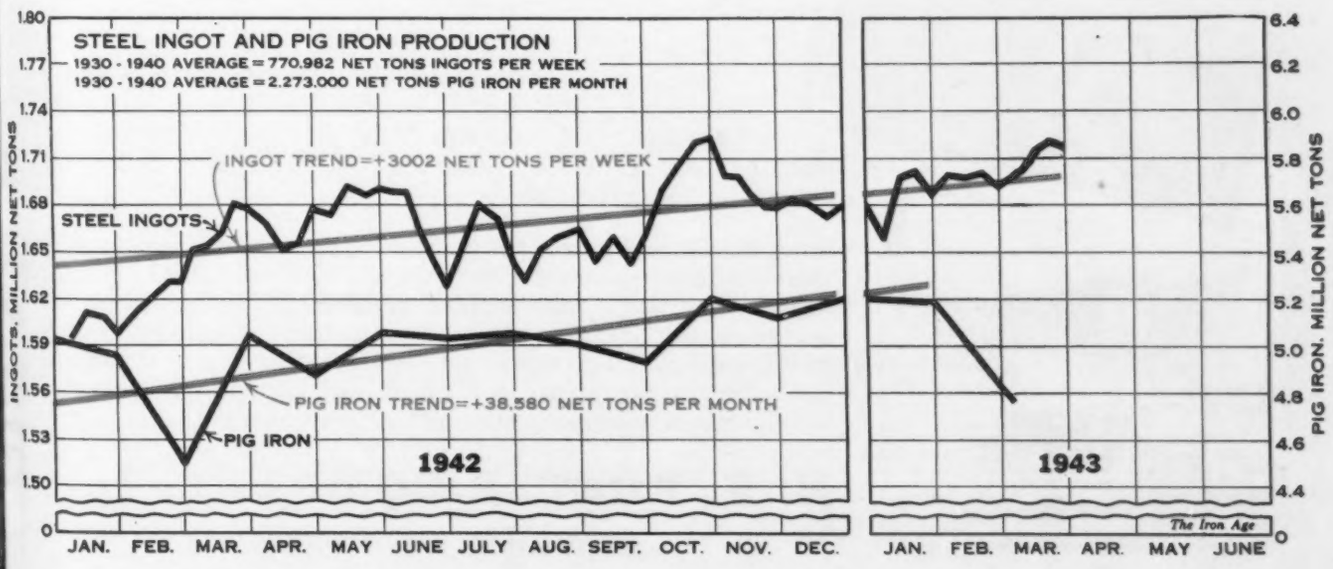
Renegotiations Active in Steel

• • • The steel industry is in various stages of renegotiations by the Army and the Navy. The renegotiation committees are not interested in the net income of the companies. They are obtaining information of the gross sales and the actual cost of these sales. Some renegotiation officials indicate that a profit or return of half of what was normally made is enough in times like these. The fact that a company has been renegotiated before is no reason why it will not be up again for scrutiny.

Last week Undersecretary of Navy Forrestal stated that about $35-billion in Navy contracts are being renegotiated to bring a refund to the government of $934-million. Forrestal said that $531-million of the anticipated refund would be in the form of reductions in prices of goods and munitions already ordered, $150-million would be voluntary reductions in prices and $253-million would be actual refunds in cash. Aircraft contracts loom as the most numerous, he said.

While the renegotiation committees are at work on the over-all profits of steel companies, the OPA continues to study the entire steel price extra system.

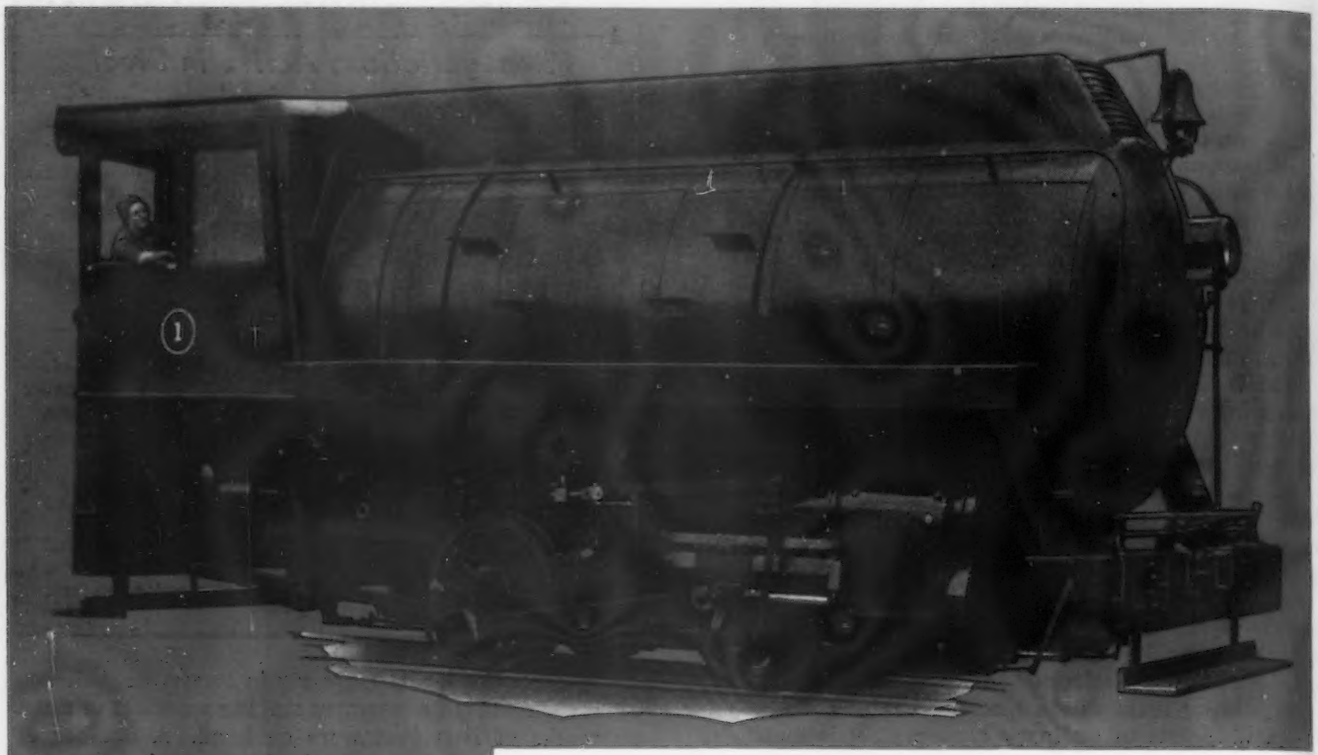
MONTH by month the transportation equipment and machinery operated by and for civilians, including such essential equipment as that used in farming, is in need of additional repair parts. At the same time, spare parts requirements for equipment used by United States fighting forces in far off lands are increasing. As the British found long ago, adequate "spares" constitute one of the greatest problems of the war.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S.Ohio River	St. Louis	East	Aggregate
March 18	102.0	98.5	102.0	93.0	98.0*	104.5	88.0	102.0	104.5	102.0	99.0	104.5	95.5	100.0
March 25	103.0	99.0	96.5	93.5	96.0	106.5	88.0	102.0	105.5	102.0	105.0	106.5	95.5	100.0

* Revised



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Dislocation of Workers Minimized as CIO Presses for 48-Hr. Week in Steel

o o o

Washington

• • • **Labor sources** said this week that there would be no serious employee dislocation caused by establishing the 48-hr. week in the steel industry. Previously figures quoted most frequently by trade sources said that approximately 100,000 workers would have to be discharged when the longer week is instituted. It is now contended that if establishment of the 48-hr. week is spread over a 60 to 90-day period, new steel expansion will take up 50,000 to 60,000 workers.

In this connection labor sources say no more than this number of workers in the basic steel industry would have to be let out if the week were put into effect suddenly. Executives in the WPB steel division are in general agreement with the proposal made by Philip Murray, CIO president and chairman of the WPB steel division labor advisory committee, that a 48-hr. work week be instituted throughout the steel industry, though no such formal announcement has been made. Comment expressed was personal opinion and cannot be considered as binding on WPB.

This proposal was made last Friday at the first meeting of the labor advisory committee with steel division officials. Though formal recommendations on this question are now being prepared by the committee, it is generally conceded that 48-hr. will become the rule.

Trade sources have estimated the cost in wages to be $104,000,000 but labor men do not agree, saying that the cost will actually be about $73,000,000 in excess of the present wage bill. Labor officials point out the 48-hr. week will only mean 46½ actual hours over the entire industry because of breakdowns and absenteeism. They said that it will only be a difference of five hours at time-and-a-half, since the industry is now working 41½ hr. a week on the average. The estimate of $73,000,000 is obtained by multiplying the cost of the five hours at time-and-a-half which equals $2.70, by the 52 weeks in a year. This equals $140 which in turn is multiplied by 520,000 the number of workers stated to be employed by the steel industry.

However, Mr. Murray pointed out there will be a serious manpower problem in the industry since he said the armed forces have absorbed ap-

48-Hr. Week at Gary Arouses Protests

Chicago

• • • The War Manpower Commission action last week in making a 48-hr. work week mandatory in the nearby Gary steel mill area and recommending that no additional war contracts be placed in the Chicago proper area has met with a storm of protest from local labor leaders, as well as industrial and commercial interests.

Observers who have been following the labor supply picture here for some time say that while there is some maldistribution of labor, there is by no means a labor shortage yet.

It was pointed out that over 12,000 unemployed persons received jobless benefit checks in Chicago area in February.

The decision of the WMC to reclassify the Chicago and Gary areas was apparently arrived at without prior consultation with local manpower groups. An eight-man committee, formed in January to act as advisor to the Chicago WMC office, reported that it had not been consulted before the action was taken and that the committee does not feel that Chicago faces any manpower shortage which could not be corrected without Federal controls.

Brig. Gen. T. S. Hammond, Chicago ordnance district chief, reported that the ruling would not appear to disturb ordnance contracts, present or future, in the Chicago district.

Application of the 48-hr. work week to the Gary steel plant area is expected to present a difficult problem to management. Officials of one large plant there said that about 65 per cent of their employees were already on a 48-hr. week. The remaining group is made up in a large part of workers on mills whose operations are restricted by WPB orders to partial operation each week.

proximately 186,000 workers from steel and steel fabricating plants, of which 90,000 to 100,000 came from steelmaking units. Partial solution of the manpower problem may be sought in the creation of a mechanism to drain employees discharged in shell-making and bomb manufacturing facilities back to the steel industry. New ordnance contract cutbacks have been responsible for reducing working forces.

Though there is general agreement between labor and management in the industry that the 48-hr. week become a rule, the point of contention is time-and-a-half overtime. Some WPB officials have said that while the time-and-a-half overtime will not seriously injure large steel units the smaller companies may be forced to the wall. Either that or prices will have to be increased.

H. G. Batcheller, steel division director, told the committee that the bottleneck in steel has now shifted from plates to alloy steels and forging quality carbon steels.

Trend to 48-Hr. Week Already Started

Pittsburgh

• • • **The Steel Labor** Advisory Committee's recommendation for a 48-hr. week in the industry comes at a time when the trend has already started that way on a voluntary basis. The speed with which such a changeover can be made depends upon ironing out the difficulties encountered in balancing work crews and establishing new crew schedules.

Immediately after the agitation for a 48-hr. minimum week in industry some weeks ago, many steel companies began to lay plans to put so-called continuous operation employees on a 48-hr. week instead of a 40-hr. week schedule. Other companies have not made much progress in tending toward a 48-hr. week in the continuous operations such as by-product coke, pig iron and open hearth.

While the operations of these departments had always been on a basis of 24 hr. a day, seven days a week, the work was done by crews averaging 40 hr. a week until a few months ago. One large steel plant in this district, on a spot check early this week, found that more than 60 per cent of the open hearth employees were on a 48-hr. week basis. The trend in this plant is towards a complete 48 hr. a week basis for such employees, and probably represents the general trend.

Other steel plants while they have made plans to put continuous operations workman on a 48-hr. week schedule have so far been able to do this only on a limited scale. This may be because of the higher age grouping and consequently less drain to the armed forces or it may have been because labor turnover was not high in that particular plant.

As far as finishing mill schedules are concerned it is doubtful if they can go on a basic 48-hr. week for the workman because their operations are dictated by WPB monthly steel product directives. These directives allow the mills to turn out only so much steel. This means that the mill may have a work load that would only give each employee 40 hr. a week or less.

While certain finishing mill operations might be heavy enough to give most of the workmen more than 40 hr. it is also true that the making of certain other steel products has been so restricted that operations have been at a point where less than 36 hr. a week has been available for the workmen on that mill.

If the 48-hr. work week becomes mandatory in the steel industry before it has a chance to become effective on a voluntary basis it will mean in some cases that many hundreds of employees will be "let go."

Phil Murray's statement that the 48-hr. week will provide manpower for increased production facilities is ambiguous because steel production is geared to continuous production around the clock. The change of the scheduled hours a week per man would have nothing to do with the total production of steel.

Murray's contention, however, that a 48-hr. week would make up for the drain of workers to the armed forces is well taken, according to some steel officials here. That is exactly what is happening in some plants and that is why these plants are going to a 48-hr. week as soon as possible.

One group of steel workmen which have been putting in 48 hr. a week or more for some time, include the maintenance and repair gangs—they have plenty of work to do these days. There is also a shortage of this type of workman.

On the other hand, mills are daily running the chance of losing skilled workmen because they can not get as much or more than 40 hr. a week.

Summing up the question from the standpoint of this steel center:

Some companies already have instituted a 48-hr. week for a large percentage of employees who a few months ago were on a 40-hr. week, this trend will continue there; some plants have not reached this point yet because conditions have either not forced the change or plans have not yet been completed; there is little chance that finishing mills can give their workmen a 48-hr. week as long as WPB directives hold production down on these mills; a mandatory 48-hr. week in steel would mean that in some plants large layoffs would occur and these men would either go to other steel plants or to other war industries; and finally the WMC here has publicly stated that the 48-hr. week for Pittsburgh was "inevitable."

Many steel employees who have not been getting 48 hr. a week have quit steel jobs and gone to war plants where 55 and 60 hr. are available. *This fact* and the drain of the armed forces will in a large measure themselves expedite the 48-hr. week in the steel industry, according to some authorities.

The weekly average work week in steel set currently at around 41 hr. is heavily effected by finishing mill work hours. Probably on a percentage basis of various hours worked it would be found that no small number of workers were getting much more than 40 hr. a week.

Steel Men See Wage Victory in 48-Hr. Plan

New York

• • • Steel men here, viewing the 48-hr. week recommendation of the WPB Labor Advisory Committee, foresee a hidden wage victory and point out that production could not be increased by such a measure since steel production had been maintained at the peak of theoretical capacity in the face of a shrinking work force which has dropped from 655,000 last Summer to about 633,000 at present. WPB directives set the total production and manpower has not created a hazard in steel to date except in a few industry-congested areas, reports indicate.

An interesting feature of the drop in employment was described as related to the changeover from high manhour products to low manhour products. An example of this is tinplate which requires about 40 manhours per ton compared with ships plate requiring only about 16 manhours per ton.

30,000 Unemployed and 7000 Empty Houses in Scranton, Neglected City

• • • **While manpower and** housing shortages cause problems in war production centers, there exist in the U. S. 82 paradoxical industrial areas of unemployment and empty houses. These areas of surplus men and homes include some of the best established industrial cities of the country, with trained labor, transportation, and economically sound locations.

The strange neglect of these areas appears even stranger and more tragic upon examination of their World War II case histories. As an example, the case of Scranton, Pa., is presented here. In many ways its experience in attempting to get war work and the frustration it has encountered parallel that of other depressed areas. It is, however, atypical in that it is believed to have made the hardest fight to channel its idle labor into war production.

In Scranton men are now applying for women's jobs. In the greater Scranton area, with a population of 300,000, there are more than 30,000 unemployed and 7000 empty homes. More than 20,000 men have entered the armed forces, one of the highest per capita rates in the country. Another 20,000 or more men and women have left for Bridgeport, Baltimore and other already crowded war boom cities. They send back to their families in Scranton more than half a million dollars a month.

Heightening this paradox, the War Department, in awarding about 25 per cent of its contracts for camouflage nets to Scranton plants, called the city one of the best locations in the country for war production, well protected in the mountains, near points of embarkation, with good transportation, good fuel and good labor. "Economically," said the War Department spokesman, "there are few like it."

The veins of anthracite coal in Lackawanna County, of which Scranton is the seat, are running out. During the last decade 25,000 miners' jobs have disappeared, leaving only 12,000 employed in coal mining. The manufacturing plants already in existence in the area are working nearly at capacity, but the great need of Scranton and its idle labor is new plants. This was the conclusion reached by the Federal Anthracite Coal Commission, appointed in January, 1942, by the President. The Commission commented as follows:

"This investigation has shown that the anthracite area has substantial possibilities for industrial expansion. At a time when most manufacturing areas of the nation are striving desperately to meet shortages of manpower and to build new housing and other community facilities, it is in the national interest that the industrial resources of the anthracite area be utilized. It is strongly recommended that the war agencies of the Federal Government give careful consideration to the suitability of the area for the location of necessary war plants, particularly those for the production of aluminum, zinc, synthetic ammonia, explosives, castings, forgings, armor plate, machine parts, aircraft parts, tank parts and ammunition."

In April this report was sent to the Army, Navy and WPB by the President, together with a letter urging that they act on the Commission's findings. In June another Presidential letter was sent to Secretaries Stimson and Knox and to Donald Nelson, WPB chief, asking what had been done and urging action.

To date, the only concrete result has been the location of a piston ring factory, employing 400 on a shift, obtained over opposition that provides a strange tale.

The director of the Scranton Chamber of Commerce and the editor of its morning newspaper, hearing that the Air Corps had requested greater piston ring production from the U. S. Hammered Piston Ring Co. of Sterling, N. J., persuaded the company to build the necessary new plant in Scranton. After much battling with the WPB Plant Facilities section, which wanted to locate the plant in Baltimore as a part of American Hammered Piston Ring Co., the Scranton site was finally approved. Approval proved to be only tentative, however; the company was abruptly asked for a stiff production guarantee which it felt unable to meet and the plant building was cancelled. This created so much protest that the plant was re-located in Scranton, under management of the Wilkening Mfg. Co. of Philadelphia. It will be ready for operation in June.

After many months of cajoling the WPB's Plant Facilities section and its aluminum and magnesium branch, Scranton was promised, in June of last year, an aluminum extrusion plant to employ 2000 on a shift. It was to have been located at Harding, between Scranton and Wilkes-Barre. This approval again proved to be only tentative. WPB reported that engineers who drilled at the proposed site said the ground would be unable to stand the pounding of the machinery because of quicksand between the rock strata.

Scranton hired Dr. Arthur Casagrande, soil mechanics expert of Harvard University, to make drillings and a survey. He reported no quicksand to be present and reported that he found no reason why the site was unsuitable. When this report was submitted to WPB, it replied that new arrangements had already been made for the plant. The plant was assigned to Erie, one of the cities of acute housing shortage (though the government has built several housing projects there).

In the meantime, the city has pushed its case by other means. Late in 1941, the Greater Scranton Foun-

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dation Fund was formed with $25,000, to bring work to Scranton. The fund has $9000 not yet spent. It has succeeded in bringing to the city the Standard Piezo Co., a radio parts plant which by the end of the year will employ about 1000, mostly women and two tobacco companies and four clothing companies, representing a total of 5000 jobs. Through the Smaller War Plants division of WPB and the Army, the city has obtained camouflage net work employing 1000 people.

The newspaper editor and the Chamber of Commerce director have made weekly trips to Washington for the past 15 months in an effort to get war plants for the city, and recently a permanent Washington representative for the city was hired.

Since the first of the year, letters have been written to 400 officials of the Army, Navy and WPB, setting forth in detail, in many instances with charts and figures, what Scranton has in surplus electric power, labor, sites, transportation, etc. More than 300 answers have been received and have been examined by a member of THE IRON AGE staff. They provide a post-graduate course in the run-around.

Since the letters on Scranton emphasized the city's surplus of labor and housing and its need of new plants, the reply from the WPB Plant Facility section's assistant director, J. O. Lanham, Jr., is something of a classic. It reads, "We have anaylzed the contents of your letter and it is our opinion that your chief asset is the possession of buildings and potential employees. Basically you lack the machine tools which are most important to the war program. Because of this, it is doubtful whether you will be successful in obtaining prime contracts under your present conditions and plans." It was to this division that most of the other government replies referred the Scranton representative.

The reasons for all this strange frustration appear to be veiled in mystery. The ostensible reasons, when any have been given at all, have been implausible.

A member of THE IRON AGE staff, seeking an explanation, recently spoke with R. H. Bailey, Jr., secretary to Senator Joseph F. Guffey, of Pennsylvania. Mr. Bailey, queried on why he believed the recommendations of the Anthracite Commission had not been followed, said: "I think the real reason is very simple and plain. Just about the time, very soon after.

the report was submitted the construction of plants was curtailed."

When it was pointed out to him that even now new plant sites are chosen and that the lists are published, he replied, "Is that so?"

Mr. Bailey, after mentioning the piston ring plant as evidence that Scranton was not doing so badly, disavowed any knowledge of the opposition to its location. He finally said "Anyway those anthracite regions, that area around Scranton, why they've been going back for years. What if they did get some war plants? It wouldn't help."

It was pointed out to him that this viewpoint was at odds with the one expressed in the report of the Federal Anthracite Coal Commission, which Senator Guffey had signed. Mr. Bailey's reply to this was a query as to whether his questioner wanted information or an argument.

West Michigan Shops Hoping for Contracts

Grand Rapids, Mich.

• • • **In startling contrast** to the rest of lower Michigan, Grand Rapids and its environs have very little war work and considerable unemployment. Curtailment of the furniture industry, both in wood and metal lines, has thrown thousands of workers out of jobs, and the facilities of the idle plants have been such as to make them very difficult to convert to arms output.

Grand Rapids had hoped to bound back to health with production work on glider parts, but the glider program does not appear to be progressing the way its proponents expected a year ago. A start was made on a substantial series of sub-contracts in Grand Rapids but these have not panned out as expected and many skilled wood workers which form the bulk of the city's craftsmen are once more laid off.

The western Michigan area generally has better than a scattering of machine shops but somehow these have not come completely into the orbit of war work as yet. The Fisher Body Division at Grand Rapids and the Holland Furnace Co. at Holland are neither up near capacity and are actively looking for work which has eluded them thus far. Smaller shops which have been in the tool and die field have been busy up to now but the other minor manufacturers have generally had capacity to spare.

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What's Wrong With Manning Tables? WMC Seeks to Clear Misunderstandings

New York

• • • **Justified or not,** much criticism of the Manning Table Plan has been voiced recently. Comments, apparently founded strictly on local experiences, include complaints that the plan is too complicated and unwieldly; that all companies and industries are not participating in it and that because of this draft boards are not being influenced by Manning Tables as they should; that industry might soon reject the entire plan and the War Manpower Commission is on the verge of dropping or replacing the plan, too, thereby wasting all of the time and man-hours which have been spent by some firms in preparing the tables.

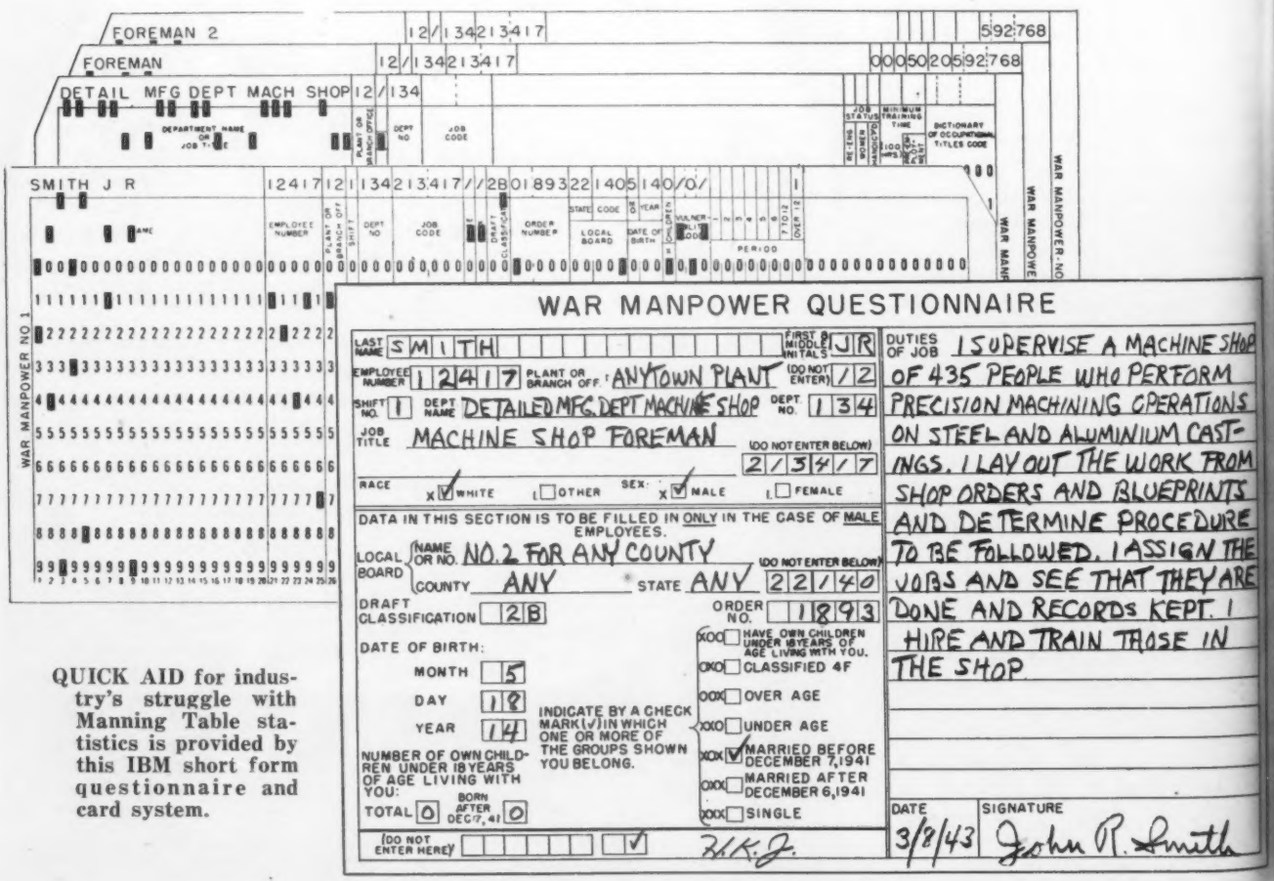
(The Manning Table is a plant or industry job analysis made up from a complete survey of the personnel requirements of the employer. The Manning Table provides a complete recording of the status and essentialness of each employee in a plant, which represents a desirable addition to many personnel departments, and at the same time provides a basis of judgment for Selective Service boards in deciding deferments which meets the employer on the common ground of facts and necessities clearly correlated.)

Some criticisms of the plan are true and deserved. However, after confronting an advised spokesman of the War Manpower Commission with these facts, a reason and moderating factor was found for each and every criticism.

The Manning Table Plan has been faced with difficulties almost from the day of its origin from the very problem for which it was conceived—shortage of manpower. The Manning Table Branch has never had sufficient personnel and, along with the United States Employment Service, has not been able to keep personnel because low appropriations and other restricting factors would not permit paying adequate salaries.

It is argued that the Manning Table Plan is not too complicated or unwieldly for industry to handle considering that PRP was made to work and the newer CMP is being taken in stride by many plants. The main difficulty with the plan is that companies were not as well prepared with past records and competent personnel departments to handle the details of a Manning Table as they were to assume the details of the priority system. Furthermore, many firms have never been called upon to spend the time and money on personnel problems that the Manning Table demands. Probably not more than 10 to 15 firms in the nation previously kept accurate and complete labor information and statistics which would be convertible to Manning Table purposes.

Now that labor control is an essential part of doing business—as essential as priorities and allotments—these records and the draft protection they afford need to become an integral part of operating, WMC says. For any firm which has not previously kept such records, the information developed for the Manning Tables will be found to supply a control of training programs, replacement schedules, up-grading, use of minority groups and a number of other fac-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FOREMAN
DETAIL MFG DEPT MACH SHOP
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WAR MANPOWER QUESTIONNAIRE
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FIRST & MIDDLE INITIALS JR
EMPLOYEE NUMBER 12417
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DEPT NO. 134
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SEX: X MALE
DATA IN THIS SECTION IS TO BE FILLED IN ONLY IN THE CASE OF MALE EMPLOYEES.
LOCAL BOARD NAME OR NO. NO. 2 FOR ANY COUNTY
COUNTY ANY
STATE ANY
DRAFT CLASSIFICATION 2B
ORDER NO. 18943
DATE OF BIRTH: MONTH 5 DAY 18 YEAR 14
NUMBER OF OWN CHILDREN UNDER 18 YEARS OF AGE LIVING WITH YOU: TOTAL 0 BORN AFTER DEC 7, 41 0
INDICATE BY A CHECK MARK (✓) IN WHICH ONE OR MORE OF THE GROUPS SHOWN YOU BELONG.
XOO HAVE OWN CHILDREN UNDER 18 YEARS OF AGE LIVING WITH YOU.
OXO CLASSIFIED 4F
OOX OVER AGE
XOO UNDER AGE
XOX ✓ MARRIED BEFORE DECEMBER 7, 1941
OOX MARRIED AFTER DECEMBER 6, 1941
OOX SINGLE
DUTIES OF JOB I SUPERVISE A MACHINE SHOP OF 435 PEOPLE WHO PERFORM PRECISION MACHINING OPERATIONS ON STEEL AND ALUMINIUM CASTINGS. I LAY OUT THE WORK FROM SHOP ORDERS AND BLUEPRINTS AND DETERMINE PROCEDURE TO BE FOLLOWED. I ASSIGN THE JOBS AND SEE THAT THEY ARE DONE AND RECORDS KEPT. I HIRE AND TRAIN THOSE IN THE SHOP
DATE 3/8/43
SIGNATURE John R. Smith

QUICK AID for industry's struggle with Manning Table statistics is provided by this IBM short form questionnaire and card system.

Modern inspection by optical projection saves time and money

Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

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Springfield, Vermont, U. S. A.

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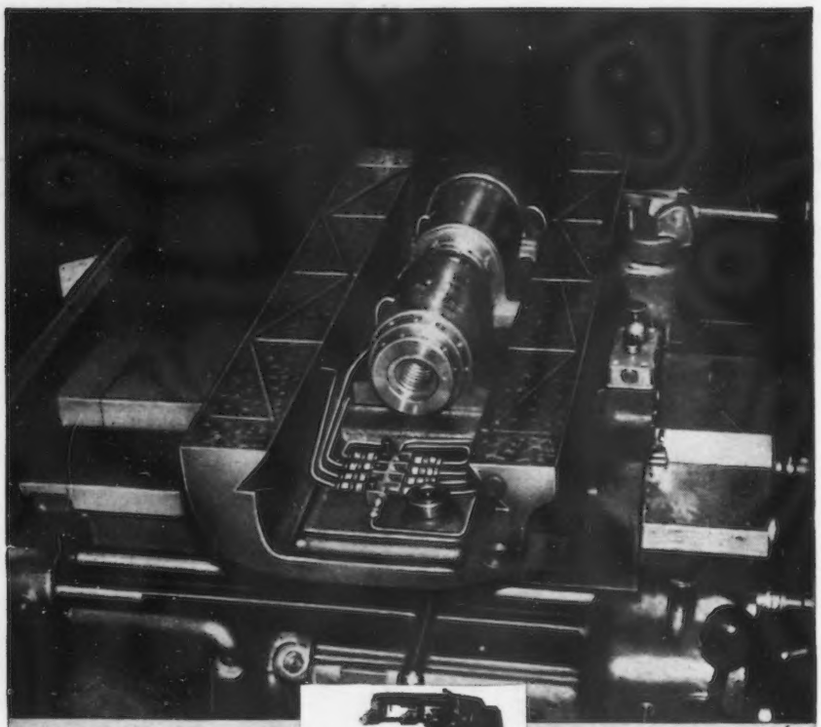
Profit-Producing Machine Tools

Photo Courtesy International Business Machines



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. . . Bijur-Lubricated

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Cuts maintenance costs, too!

Bijur Lubricating Corporation, Long Island City, N. Y.

BIJUR

AUTOMATIC *Metered* LUBRICATION

1614

tors of labor supply. For the first time, industry is provided with a workable plan which affords an overall picture of the specific labor situation. Despite complaints that the plan is too complicated, WMC says, it is inconceivable that industry will reject it.

The complaint that all companies are not participating in the plan and that draft boards are consequently not totally influenced by Manning Tables is partially true and partially false. Truly, a small percentage of firms thus far are under the plan. This again traces back to insufficient personnel to introduce the plan. Since the plan is not immediately understandable by every company, Manning Table experts are needed to present and explain the plan personally. Enough of these are not available and some concerns have not even been contacted but work is progressing as fast as possible, according to WMC reports.

The complaint against the draft boards apparently has very little foundation. The fact is that when a concern, working under the Manning Table Plan, files Form 42-A with the local boards stating the necessity of a man and giving the deferment time required to replace the man, all draft boards know that both state and Presidential appeals will uphold the deferment and the boards are thus forcibly influenced to regard the terms of the plan. Peculiarities of local boards have no power in this instance.

The question of the WMC dropping the Manning Table Plan or replacing it with a new system resolves itself in the fact that no noticeably simpler system has made an appearance even as a suggestion and that so long as control over labor supply is needed as a part of our economic controls, some form of the Manning Table Plan is necessary. WMC is not likely to drop it. WMC does state frankly that changes will be required from time to time but these will not be of a nature to render past records useless.

Returning to the question of handling the plan and its acceptance by industry it is interesting to note that the drop forging and grey iron foundry industries have accepted the plan whole heartedly through their associations and are about to come under the plan 100 per cent. Both industries have published special job classifying and coding dictionaries for guidance in establishing the plan. Recent reports indicate that the shipyards throughout the country will soon be

under the plan at the request of the Maritime Commission and the nation's air lines will soon follow by request of the ODT. The American Iron and Steel Institute has just completed a series of meetings throughout the steel industry designed to explain and help establish the Manning Table Plan in steel. Hence, it seems that the plan is being judged by some observers too harshly and too soon as it appears to be coming into its own in the near future.

International Business Machines has developed a simple questionnaire form which can be filled-in by the employee without trouble and from which personnel departments can readily key punch the information onto IBM machine sorting cards or hand code. Remington - Rand has brought out a visual type Kardex form which adapts itself nicely to the purpose. Incidentally, it is estimated that this last method costs about 17c. per employee to install complete.

Where personnel departments are available the plan offers very little difficulty to industry. The biggest problem lies in the small, unequipped concern. Here, again, the problem minimizes itself just as it has in labor stabilization problems where small plants are somewhat disregarded.

HEALTH BOMBS: A soldier demonstrates operation of new insecticide dispensers which will protect his buddies on tropical battlefronts against malaria and yellow fever. The insecticide is discharged as a mist from 6-in. metal dispensers called "bombs" by the Westinghouse workmen who make them.

EUREKA

TOOL STEEL ELECTRODES SAVE

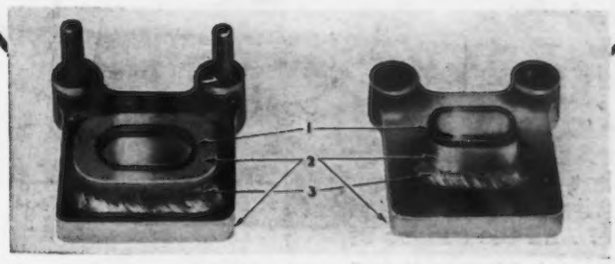
tons of vital TOOL STEEL

Every day, tons of critical tool and die steels are being saved for vital war needs by the use of EUREKA Electrodes for the welding of worn or fractured dies. These EUREKA Electrodes can be used to effect maintenance repairs in *your* shop on oil, air and water hardening and hot working steels.

EUREKA Electrodes also save a vast amount of tool and die steels when used for the composite construction of dies, by welding on the working edges of *less* expensive and easily procurable carbon steels.

If you really want to save tool and die steels in the construction or repair of your dies it will pay you to write for our 16-page catalogue today. It describes in detail the use of the complete line of EUREKA Tool Steel Electrodes.

HERE IS HOW IT HELPS THE WAR EFFORT



★ Illustration shows typical fabricated dies. Arrows 1 point out tool steel electrode deposits used as cutting edges, neither of which are over $\frac{3}{16}$ inch thick. Arrows 2 indicate machine steel used instead of tool steel to lower die composition cost, and 3 refers to construction welds made of mild steel rod to hold die parts together.

★ *Write for information on "SUTTONIZING" our welding process for the reclamation of high speed steel cutting tools.* ★

WELDING EQUIPMENT & SUPPLY CO.

230 LEIB STREET • DETROIT, MICHIGAN

Why don't you be Upp and Adam too and conserve tool steel for Uncle Sam — mail this coupon to us right now!

WELDING EQUIPMENT
& SUPPLY COMPANY
230 Leib Street
Detroit, Michigan

Gentlemen: Please send us complete information about "Suttonizing."

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Moving Up with the Advance Units

KEYSTONE Wire

The success of practically every action — however small — depends heavily on a key Signal Corps man. And the success of his equipment depends on numerous wire mill products — such as Keystone is helping to produce.

The Signal Corps operator contacts many supporting forces — air, land and sea. They all use wire mill products too, in thousands of "fighting" forms.

Keeping up a continual flow of these war-time essentials has "drafted" much of our production until Victory is assured. As soon as that goal is in sight, some production may be released to meet, at least partially, a tremendous CIVILIAN demand.

KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS

Just a few of thousands of wire mill products for war uses.

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Briefly Told—

• **Albany, Oregon, has been selected as the site for the Northwest electrodevelopment laboratory where Bureau of Mines metallurgists will study the recovery and processing of minerals from the Pacific Northwest as part of a program to utilize this region's vast resources in winning the war. Negotiations have been completed for the purchase of the vacated buildings and grounds of the Lewis and Clark College.**

•

• **H. A. Brassert,** head of H. A. Brassert & Co., New York, together with three top-ranking men of the mining engineering field, have conferred with Governor Broughton of North Carolina regarding a survey of the state's mineral resources. Much attention will be given in the survey to the production of sponge iron and magnesium. C. C. Morfit, authority on coal mining and coal preparation and a member of the group, pointed out that not only will sponge iron relieve any scarcity of scrap metal, but it is generally better than scrap for production of higher grades of steel.

•

• **The parts played by employees and management in the successful prosecution of the war are outlined in a new employees' manual issued by The Baldwin Locomotive Works, Philadelphia. The booklet outlines the early history of Baldwin and tells of the activities of the company, all of which are directly or indirectly tied to the war effort.**

•

• **Lieut. Gen. Brehon Somervell,** in a statement to members of his staff on the occasion of the first anniversary of the Services of Supply, reported the following list of achievements accomplished by this division. The Services of Supply, he said, has procured $17,000,000 worth of supplies and equipment for the Army; has accepted delivery on a large portion of the immense war production program; has inducted, classified, and assigned more than 4,000,000 men; has fed these men adequately, clothed them, housed them, and kept them well; has constructed $6,000,000 worth of military facilities; has moved over 1,000,000 men and 14,000,000 tons of supplies and handled millions of domestic movements, and has set up an administrative organization for the largest American Army in history, and made that organization function.

Site Selected for Electro-development Laboratory in West

• *Changes in the aircraft industry continue to be numerous. . . . Stockholders of both Consolidated Aircraft Corp. and of Vultee Aircraft, Inc., last week approved a merger into a consolidated company to be known as Consolidated Vultee Aircraft Corp., with Tom Girdler as chairman and Victor Emanuel elected to the board. . . . Henry J. Kaiser last week became chairman of the board of Brewster Aeronautical Corp. with plants in Long Island City, Newark and Johnsville, Pa. The company is said to hold $257,000,000 in government contracts. . . . Kaiser is also reported to have gone into production of a new kind of dual-purpose aircraft carrier, which he expects to deliver at the rate of six a month by the end of this year.*

•

• **The Aluminum Co. of America has completely rewritten its welding book edition, and in addition to welding has incorporated the art of brazing aluminum. A valuable feature of the manual is a two-page spread in color showing the various flame adjustments for torch welding and brazing aluminum. Copies of this new booklet are available free of charge by writing to the Aluminum Co. of America, Pittsburgh.**

•

• **A new and improved type** of box car petroleum carrier may soon be helping to solve the East's oil drought as the result of experimental efforts of the Baltimore & Ohio Railroad, the ODT said recently. The model, constructed by the B & O in its Mt. Clare shops at Baltimore, is a standard automobile-type steel box car fitted with four steel tanks encased in wooden boxes. The tanks were constructed of 1/16-in. sheet steel, riveted and welded.

•

• *A new, revised standard steel analysis chart, published by American Steel & Wire Co., U. S. Steel Corp. subsidiary, is designed to aid wartime steel users. Embracing all modifications and changes in the analyses of AISE, SAE, and the new NE steels up to February 1, the chart folds up to a small, compact size readily available for easy reference. A new helpful feature is the breakdown which shows whether or not various types of products are available in specific analyses, together with the listing of the varying amounts of different component elements used in producing the*

Here's a Helpful Book for BUYERS AND ENGINEERS

AIDS IN RECKONING PRICES AND ESTIMATING

● Let us send you this new Thomas book. It's for those who are interested in cold rolled strip steel pricing data, as it applies to purchasing and estimating. You will find it useful. It not only contains general information, but also the classification of extras on cold rolled strip steel in low carbon, high carbon, and flat wire, as well as on electro-coated products. The book gives you complete information which can be read easily and used with minimum effort. It may suggest a means of reducing costs and saving vital non-ferrous materials, while it aids in the selection of a steel and finish which will increase your production. Send for your Classification of Extras Book today.

Thomas Strip

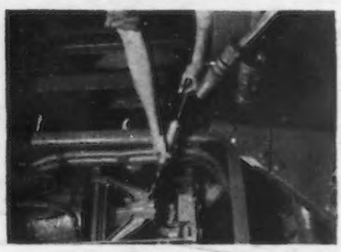
BRIGHT FINISH NOT COATED, SOLDER COATED, ELECTRO-COATED WITH NICKEL, ZINC, COPPER, BRASS

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

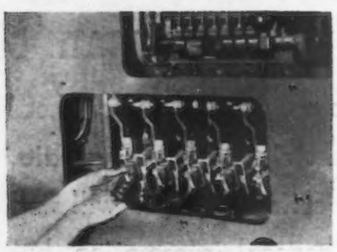
THE THOMAS STEEL CO. • WARREN, OHIO

How to keep Your Trucks Running FOR THE DURATION

● Proper maintenance of industrial trucks always pays dividends, but today it becomes a deciding factor in the success of our war production effort. Most truck failures can be avoided by routine care and maintenance.

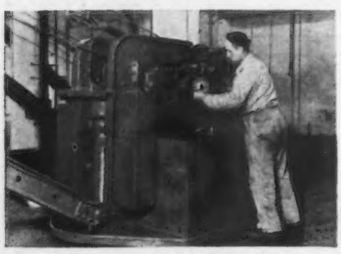


Correct lubrication according to manufacturer's instructions is an essential phase of truck care.



Control equipment should be inspected monthly. Here mechanic is replacing a finger tip.

Dust covers should be removed monthly to inspect commutators and brushes... Brushes should have at least 60% bearing surface.



Removing the rotor disc from the magnetic disc brake for monthly inspection.

First—Provide good floor conditions and DO NOT overload.

Second—Place trucks under the supervision of a competent mechanic.

Third—Lubricate regularly as instructed by manufacturer.

Fourth—Keep a record sheet covering weekly inspection findings, lubrications, adjustments, repairs. Thus excessive wear can be spotted and serious damage overcome.

ROUTINE SCHEDULE FOR TRUCK MAINTENANCE

Every Week. *BRAKES*—Test service brakes for stopping with maximum load, and parking brakes for holding on steepest incline. Adjust as required. Inspect linings—if dirty or greasy, wash in gasoline, if worn, replace.

STEERING CONNECTIONS—Test for:

a) Lost motion at ball joints and rod yokes due to wear.
b) Tight joints at rod yokes due to bent levers or rods.
c) Misalignment of steering wheels.
d) Worn bearings in steering post or ball crank.

Make adjustments according to instructions, and replacements as required. WHEEL ALIGNMENT—Follow manufacturer's instructions for checking and lining up wheels on each type of truck. LIFT OR HOIST—Clean grease and dirt from rails, inspect chains, anchor bolts, hydraulic system, and limit switch. Use neatsfoot oil to keep leathers soft. LUBRICATION—Follow manufacturer's instructions for points requiring weekly lubrication. ELECTRICAL EQUIPMENT—If working in dusty environment, remove covers from motors and electric controls, and blow out dust.

Every Month—Monthly inspection covers the most important mechanical parts of truck: power axle, wheel bearings and universal joints, spindle bearings, drive and torque yokes, Oldham coupling, trailing axle and wheels, brake drum, motors, brushes, controller, contactor, limit switches, hydraulic lift. Repairs on these parts are costly. Do not slight any part that requires lubrication. Keep moving parts free from dirt and grease. Follow detailed instructions from manufacturer.

Maintenance check list is available in bulletin form. Write for your copy or copies today.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2175 WEST 25th STREET • CLEVELAND, OHIO
In Canada: Railway and Power Engineering Corp., Ltd.
2900-2A-43

Baker INDUSTRIAL TRUCKS

various grades of steel. The chart covers carbon and free cutting steels, manganese, nickel, nickel chromium, and molybdenum steels, in addition to chromium, chromium vanadium, silicon manganese, and NE steels.

•

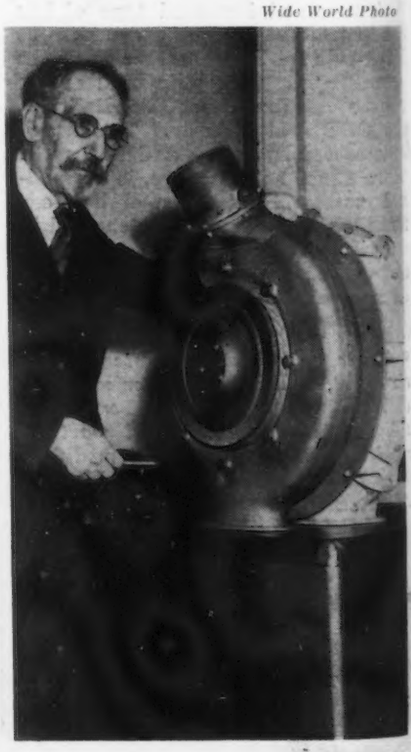
• **Domestic bookings** of electric industrial trucks and tractors during the month of January 1943 totaled 323 units according to figures just released by the Industrial Truck Statistical Association, 208 South LaSalle Street, Chicago. The net value of chasses only booked during January totaled $1,639,547.02.

•

• **Packard Motor Car Co.** will return to production of motor cars after the war, said its annual report. This decision was said to be definite regardless of whether the company stays in the special engine field which it has entered by manufacture of Rolls-Royce aircraft engines and marine motors for PT boats. During 1942 Packard signed 196 new franchises for dealer outlets when the war ends. Dealer loss during the first year of war was stated to be about 11 per cent, comprising dealers accounting for 2.5 per cent of company sales.

SO PLANES CAN BREATHE: Dr. Sanford Alexander Moss displays his turbo-supercharger which has given American aircraft higher ceilings than planes of enemy nations by enabling them to "breathe" and maintain full horsepower in the thin air of higher altitudes.

Wide World Photo



Range Totals Given For Superior Ores

Cleveland

• • • **In the annual summary** of shipments of Lake Superior iron ore from the mines to upper lake ports and all-rail shipments from the mines, the Lake Superior Iron Ore Association, reports that United States ranges shipped 93,008,726 gross tons during 1942. Canadian shipments from the mines totaled 486,666 gross tons, bringing total of all mine shipments to 93,495,392 gross tons.

Of the total United States range shipments, 17,961,746 gross tons were beneficiated ores, while the entire output from Canada's Michipicoten range was beneficiated.

Shipments from the various ore ranges were as follows:

Range	Total Gross Tons
Mesaba	70,280,087
Vermilion	1,924,877
Cuyuna	3,035,532
Fillmore County, Minn.	59,171
Total Minnesota	75,299,667
Gogebic	6,237,894
Marquette	6,540,731
Menominee	4,930,434
Total Michigan-Wisconsin	17,709,059
Total United States Ranges	93,008,726
Michipicoten, Canada	486,666
GRAND TOTAL	93,495,392

All ore subjected to various methods of beneficiation during the past year was from Minnesota ranges or Canada's Michipicoten range. Tonnages beneficiated by various means were as follows:

Beneficiated Lake Superior Ores, 1942

Product of Beneficiation	United States (Minnesota) Gross Tons
Washed	15,469,163
Jigged	1,087,233
Hi-density, including tailings shipped as siliceous ore	606,366
Sintered	289,729
Dried	509,255
Total ore beneficiated	17,961,746

COMING EVENTS

March 25 to 27—American Society of Tool Engineers, Milwaukee.

April 8 to 9—SAE National Aeronautic Meeting, New York.

April 8 to 10—Electrochemical Society, Pittsburgh.

April 12 to 16—American Chemical Society, Detroit.

April 28 to 30—American Foundrymen's Association, St. Louis.

April 29 to 30—American Institute of Mining and Metallurgical Engineers, Cleveland.

June 9 to 10—SAE War Materiel meeting, Detroit.

Turner's new plant has enabled them to increase their production facilities—that is why Turner can definitely promise delivery within a short time on their ring, flush pin and snap gauges.

This fast delivery has already proved valuable to many war plants throughout the country who have been on the verge of shut-downs due to the lack of gauges.

If you need ring, flush pin or snap gauges let us show you what Turner can do on delivery promises!

Wire your order today!

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Turner Gauge Grinding Co.
Ferndale, Michigan

Gentlemen:

Please rush complete information on your ring, flush pin and snap gauges today!

Name _____ Title _____

Address _____

City _____ State _____

Where "All Outdoors" is Your Warehouse!

MANY plants are now forced by lack of adequate inside space to store materials out of doors—creating handling problems which can be efficiently solved with Ross Heavy-duty Hydraulic Lift-trucks. These pneumatic-tired machines with their balanced chassis design have the stability essential to swift, economical handling of heavy loads on unimproved surfaces—where most types of machines cannot operate. Ross Heavy-duty Hydraulic Lift-trucks, 3 to 7 ton capacities, may be the solution to *your* out-side storage problems . . . Write for Bulletin 1-33 today.

ROSS

HEAVY DUTY MATERIALS-HANDLING EQUIPMENT

BENTON HARBOR • MICHIGAN

Save Lumber, Use Steel, Designer Told

• • • An industrious fellow from New Jersey thought he was doing the government a great service when he designed a new manufacturing plant to be built of lumber instead of steel. Upon presenting his blueprints to government officials in New York, the plans were rejected and he was told that his plant must be built of steel because lumber is a more critical material!

About the only explanation offered by government officials at New York for this strange situation is that lumber is being used extensively in crating overseas shipments, making lumber supply situation unusually tight.

SWIMMING JEEPS: Amphibian jeep trailers manufactured by Willys-Overland Motors come out of the water. The one on the ramp has just grabbed hold with its wheels. Designed to carry a quarter-ton load on land or sea, the new vehicles weigh 550 lb., have over-all length and width respectively of 108½ and 56 in., and floor area of 19 sq. ft. With roadside height of 40 in. they present a low battlefield silhouette and when loaded offer a vertical target of but 6 in. in the water.

Wide World Photo

Cited for Award

• • • **The following additional** plants have been awarded the Army-Navy "E" for outstanding performance on war work:

Allied Products Corp., Plant 1, Victor Peninsular Division, and Plant 2, R. B. Division, Detroit; Plants 3 and 4, Hillsdale, Mich.
Alloy Steel Gear & Pinion Co., Chicago.
American Aluminum Ware Co., Newark.
American Cyanamid & Chemical Corp., American Powder Division, Maynard, Mass.
American Foundry Equipment Co., Mishawaka, Ind.
American Key Can Co., Chicago.
American Laundry Machinery Co., Cincinnati.
Androscoggin Mills, Lewiston, Maine.
Animal Trap Co. of American, Lititz, Pa.
Armour Laboratories, Division of Armour & Company, Chicago.
Arnold Engineering Co., Marengo, Ill.
Baldwin Locomotive Works, Eddystone, Pa.
Borg-Warner Corp., Mechanics Universal Joint Division, Rockford, Ill.
Columbian Vise & Mfg. Co., Cleveland.
Continental Mills, Philadelphia.
C. B. Cottrell & Sons Co., Westerly, R. I.
Couch-Uthe Co., Elyria, Ohio.
Drayton Mill, Spartanburg, S. C.
E. I. du Pont de Nemours & Compauy, Inc., Morgantown Ordnance Works, Morgantown, W. Va.
Eclipse Lawn Mower Co., Prophetstown, Ill.
Fisher Co., Charles City, Iowa.
Gent Machine Co., South Euclid, Ohio.
Golden State Co., Ltd., Tulare, Cal.
Harrison Radiator Co., Division of General Motors Corp., Lockport, N. Y.
Hercules Powder Co., Virginia Cellulose Division, Hopewell, Va., and Port Ewen Plant, Port Ewen, N. Y.
Holcomb & Hoke Mfg. Co., Indianapolis.
A. F. Holden Co., New Haven, Conn., and West Haven, Conn.
Hynson, Westcott & Dunning, Inc., Baltimore.
Irwin Augur Bit Co., Wilmington, Ohio.
Kelley-Koett Mfg. Co., Covington, Ky.
Mason City Tent, Awning & Canvas Co., Mason City, Iowa.
Ladish Drop Forge Co., Cudahy, Wis.
Lalance & Grosjean Mfg. Co., Woodhaven, N. Y.
Lowell Wrench Co., Worcester, Mass.
Lufkin Rule Co., Saginaw, Mich.
Midwest Piping & Supply Co., Inc., St. Louis.
Morey Machinery Co., Inc., Astoria, N. Y.
Norquist Products, Inc., Jamestown, N. Y.
Ogden Arsenal, Ogden, Utah.
Press Wireless, Inc., Hicksville, N. Y.
Shure Brothers, Chicago.
F. W. Sickles Co., Chicopee, Mass.
L. S. Starrett Co., Athol, Mass.
Wilson Mechanical Instrument Co., New York.
Stanley Hand Tools and Stanley Electric Tools divisions of Stanley Works, New Britain, Conn.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Lindberg Engineering Co., Chicago.
Goddard & Goddard Co., Inc., Detroit.

Draft Made Punishment For Striking Foundry Workers

Montgomery, Ala.

• • • **Tuscaloosa, Ala.,** draft boards on March 19 were ordered by Brig. Gen. Ben M. Smith, state director of selective service, to reclassify some 500 employees of the Central Foundry Co. at Holt, near Tuscaloosa, who the state director said, were out on strike.

PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

We have *turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.*

PARISH

PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative

F. Somers Peterson Co., 57 California St., San Francisco, California

Blooming and Slabbing Mills Are Key To Alloy Steel Output Goals

Pittsburgh

• • • **Alloy steel production**, which in 1929 constituted but 7 per cent of total steel output, climbed to 13.2 per cent of total steel production in 1942, and in January this year reached the unexpected tonnage of 17 per cent of total steel output. Major reason for this tremendous recent growth, in addition to the step-up in electric steel production, has been the substantial output of open hearth alloy steels. The WPB has, for the past several months, been putting pressure on steel companies to turn out as much alloy steel as possible by the open hearth process.

The performance of the steel industry from the standpoint of steel ingot output has been far greater than statistics would indicate. **It is estimated that for every ton of alloy steel passing through the blooming mills at least one and one-half tons of ordinary carbon steel is displaced because of the necessary increase in blooming mill time when working on alloy steel.**

One company about a month ago estimated that it was tapping carbon steel heats in 10 hours and low alloy steel heats in 13 hours. This was a reduction compared to the time required for heats a few months earlier.

The growth of alloy steel is indicated by taking 1929 as an index of 100 and latest figures show that average monthly alloy steel production in January of this year was 239 per cent greater than the average monthly 1929 output. It is estimated that 1943 output of alloy steel probably will be in excess of 256 per cent of the average monthly 1929 output. The increase in alloy steel production began in late 1940, and in 1941 was about 10.4 per cent of total steel output. The importance of aircraft and other war implements is such that alloy steel production probably will increase for the duration. While there may be some drop in open hearth alloy steel production after the war, the tremendous electric steel capacity probably will be utilized to the fullest extent.

With the greater portion of alloy steel representing hot topped ingots, there is necessarily a longer interval in the handling of the steel from the time it is poured until it reaches the blooming mill, as compared with ordinary steel. The ingots stand longer in the molds at the platform, and consequently are colder after being stripped and reaching the soaking pits than is the case with ordinary steels. This, of course, means a longer soaking period.

Coincident with the problem of producing as much alloy steel as possible, is the hot top situation. Practically all important alloy steel applications require hot topping, with the result that steel companies still are faced with many difficult problems. Outstanding difficulties include mold conditioning, stripping and soaking pit capacity. Despite these obstacles, however, it is expected that the steel industry will go far beyond the original estimates covering the production of alloy steel.

While some authorities insist that the melting time on alloy steels by the open hearth process is somewhat longer than that for ordinary carbon steels, there is every reason to believe that this melting time will be cut consistently, and before many months alloy steel may be produced in a period not much longer than that required for ordinary steels. The most important factor in the whole picture continues to be the blooming and slabbing mill outlook. The speed with which these mills handle alloy steel will determine to a great extent the realization of the goals now set for alloy steel production during 1943 and 1944.

Use of Alloy Turnings Only a Start

Cleveland

• • • **WPB's recent order** that manufacturers of alloy steels must take at least 8 per cent of their scrap purchases in the form of alloy turnings, according to some observers is merely the beginning of a program for greater utilization of this form of scrap. With the industry at present consuming about 3,000,000 tons of alloy turnings a year, the WPB order, like early rationing orders, is only a means of getting the program under way and determining its merits and defects. Furthermore, while accurate

Alloy Steel Growth
1929-1943
(000) Omitted—Net Tons

AVERAGE MONTHLY ALLOY STEEL PRODUCTION				YEARLY ALLOY STEEL PRODUCTION		
Year	Average Monthly Production	Index 1929=100	Gain or Loss (per cent)	Year	Yearly Production	Per Cent of Total Steel
1929	368	100	...	1929	4432	7.0
1936	269	73	− 27	1936	3230	6.0
1937	283	77	− 13	1937	3397	6.0
1938	138	36	− 64	1938	1654	5.2
1939	268	73	− 27	1939	3212	6.1
1940	414	112	+ 12	1940	4966	7.4
1941	717	195	+ 95	1941	8608	10.4
1942	946	257	+157	1942	11350	13.2
Jan. '43	1250	339	+239	Jan. '43	1250	17.0
Est. 1943	1325	356	+256	Est. 1943	15600	17.0

figures are not available, the volume of alloy turnings generated in the present armament program is believed many times the consumption and greater use must be made of this important source of metallics.

Most of the larger producers of alloys saw the handwriting on the wall with regard to the present WPB turning ruling prior to its issuance and were fairly well set up to handle increasing amounts of turnings as part of the scrap charge in blast furnace, open hearth and electric furnace operation. It was inevitable that such an order would be forthcoming and many plants devised or experimented with various methods for handling, such as crushing, briquetting, bundling and melting the loose turnings in special cupolas. These, as possibly other, methods have been tried quite extensively. Each has certain favorable characteristics, but crushing is rapidly gaining favor because it is done very economically and gives satisfactory results in use. The $2 gained for selling short or crushed turnings is sufficient to warrant this method of handling.

That crushing is profitable under the $2 per ton margin is borne out by the offer of one large eastern scrap dealer to set up and man crushing units adjacent to the mills to handle loose turnings as they are shipped in. While this customer service is offered, this dealer will not consider briquetting or melting the turnings. Further proof of the profit in crushing is that many manufacturing plants where the turnings are generated are equipped with crushers, which are reported to pay for themselves within a matter of months.

In addition to taking advantage of the $2 per ton premium permitted under the scrap ceilings for short or crushed turnings, there is yet another benefit in crushing turnings in the plants in which they are generated. Since one railroad car of crushed turnings is equal to three cars of loose or uncrushed turnings, shipping space is saved and loading and unloading are made easier.

While briquetting has been tried extensively, there are disadvantages to using this method of preparing turnings, mainly in cost. The turnings that are to be briquetted must first be crushed, then washed, dried, briquetted and often dried again. All of these operations cost money, and the added premium permitted under price ceilings is scarcely enough for the extra work involved. Of course, this may be done in the mill and considered part of the manufacturing process with the cost charged to production expense, but even handled in this manner the net effect is to push costs closer to the selling price of the finished steel, which is also stabilized under OPA ceilings.

There has been considerable learned in the past year or so as to the technique of handling turnings as charge material in the blast furnace, open hearth and electric furnace. Technical papers will likely appear soon before technical society meetings on the subject.

As to the use of turnings in the blast furnace, there are several specific advantages to this practice. In the first place, the blast furnace is the logical place to handle bulky melting operations, and turnings come under this classification. If 10 per cent of the charge in the blast furnace is in the form of turnings, the charge, say on a 1000-ton furnace, would be about 100 tons, and there are no steel making operations that can handle such bulk quite so easily and economically. Furthermore, the blast furnace is the natural place to reduce sulphur, which adheres on turnings from oil used in cutting and machining operations. Observers believe that blast furnace yield can be increased from the use of turnings, and producing alloyed iron presents no difficulties in subsequent steelmaking

ELECTRIC STEEL CAPACITY AND PRODUCTION

Capacity—Jan. 1 (net tons)

1929	1,458,581
1936	1,147,221
1938	1,490,858
1940	1,882,680
1941	2,586,320
1942	3,737,510
1943	4,554,980

Production

1929	1,065,602
1936	865,150
1938	565,627
1940	1,700,006
1941	2,869,256
1942	3,974,368

SEVENTY TONS of special alloy steel for war use are produced with each charge in this electric furnace at a United States Steel Corp. plant. This photo from United States Steel's latest annual report shows furnace helpers shoveling dolomite into the furnace preparatory to charging scrap for another heat of high-grade alloy steel.

operations, providing the analyses are known.

The producer with several blast furnaces at his disposal is definitely at an advantage in producing alloyed pig iron, since one furnace can be turned over exclusively to this practice, while the others can remain on regular iron runs. The operator with only one stack, however, must of necessity keep changing back and forth between alloy and regular iron runs.

The sulphur that accumulates on turnings as the result of high sulphur cutting oils used in machining presents somewhat of a problem in steel making. Many mills and manufacturers are washing the turnings to recover these oils. In electric furnace operation, the sulphur can be removed in normal operations. However, the oil itself may cause difficulties, so the usual practice is to wash the turnings. In open hearth operation, there is a choice of two methods. The turnings may either be washed to remove the sulphur, which cannot be reduced in open hearth practice, or lime can be added to the charge to neutralize the sulphur so that it does not raise the sulphur content of the finished heat. Furthermore, in crushing turnings for the open hearth charge, there is no fowling of the checkerwork of the furnace as there might be caused by charging long stringy turnings into the melt.

There has been a marked trend toward the more extensive use of chromium-nickel-molybdenum steels, such as with the NE grades, instead of straight chromium or straight nickel steels, and it is expected that this trend is only really beginning. There are specific advantages from the steelmaker's standpoint resulting from this tendency. Where a steelmaker can use scrap that contains chromium, nickel, molybdenum, or any combination of these alloying elements, he is at an advantage in buying scrap. However, the straight nickel or straight chromium steel producer must be extremely cautious that scrap purchases contain no alloys that are not permitted in the specifications of the grades of steel produced. This calls for careful handling of scrap and segregation all along the line, requiring the maintenance of many separate scrap piles.

While there has been a gradual changeover of steel specifications to wider utilization of chromium-nickel-molybdenum steels, this changeover has not reached its peak as yet.

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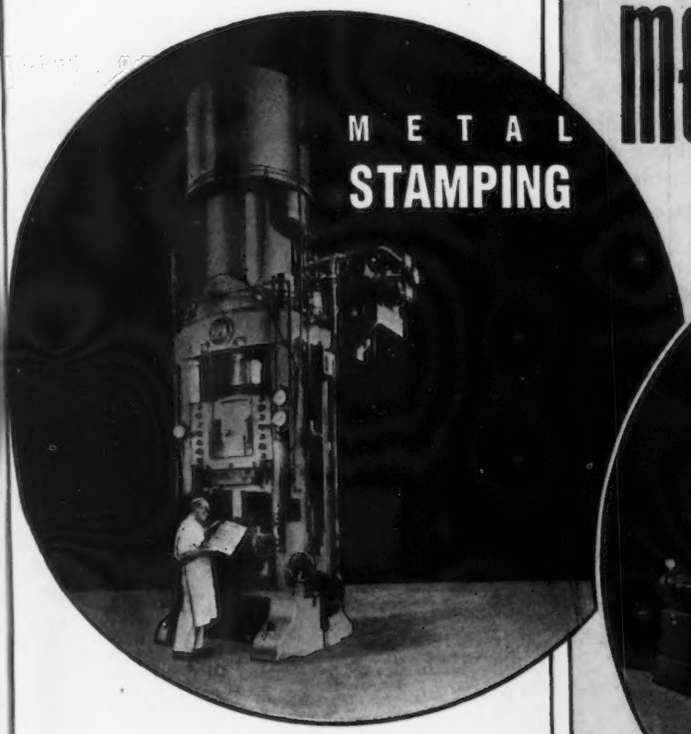
BUSINESS-INDUSTRIAL LEADER OF 1942: Henry Kaiser receives a plaque as the nation's top "Business-Industrial Leader of 1942" from "Pop" Sieglen, oldest employee of the Irving Subway Grating Co., Long Island City, N. Y. In the vote among the 550 war workers at the plant to honor management's outstanding contribution to production for victory, Henry Ford and "Eddie" Rickenbacker took second and third places respectively.

METAL SPECIALTY



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Daily Iron Ore Use Up in February

Cleveland

• • • **Iron ore consumption** in the United States and Canada in February amounted to only 7,103,914 gross tons, as against 7,765,174 consumed in January. While total consumption was down 661,260 gross tons, daily average consumption during February was 253,711 tons as against 250,489 tons a day in January. Consumption by U. S. furnaces in February totaled 6,894,181 tons while Canadian furnace consumption was 209,733 gross tons.

Iron ore stocks on March 1 totaled 32,743,294 gross tons, compared with 39,742,766 a month ago. Stocks at U. S. furnaces were 26,702,024 gross tons, with 940,306 gross tons at Canadian furnaces. On Lake Erie docks, ore stocks totaled 5,100,964 gross tons, bringing the total to 32,743,294 gross tons.

Blast furnaces in operation in United States and Canada remained unchanged during the past month, with 177 American and 9 Canadian furnaces in blast, and 4 American furnaces idle.

Birmingham Coal Stocks Small as Strike Is Feared

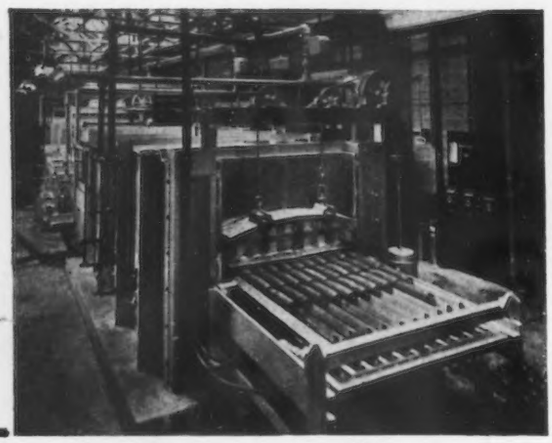
• • • **With the present** contract between United Mine Workers of America and mine operators nearing expiration, steel mills in the Birmingham district are reported to have sufficient coal on hand to meet production requirements for two and a half to three weeks. Stocks are much smaller than two years ago.

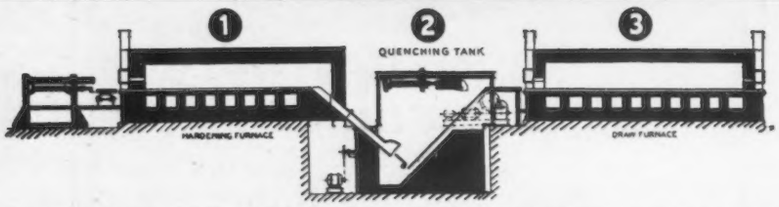
One blast furnace operator said that in event of a coal mine strike his furnaces could continue production without letup for two weeks but at the end of another three weeks his coal supplies would be exhausted with a resultant shutdown of operations.

NEW ESCORT VESSEL: Seamen aboard one of the Navy's new destroyer escort vessels get her ready for convoy duty. Visible here are the 3-in. guns used to slug it out with Axis U-boats. In addition, the DE's carry 20-mm. Oerlikon anti-aircraft guns and depth charges. Some models are equipped with torpedo tubes.

Press Association

3 IN 1 UNIT FOR HEAT TREATMENT OF SHELLS





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They are helping to assure speedy, uniform, economical production of shells in ordnance plants all over the country. Full particulars . . . with recommendations and proposal . . . will be submitted without obligation on receipt of complete information as to requirements.

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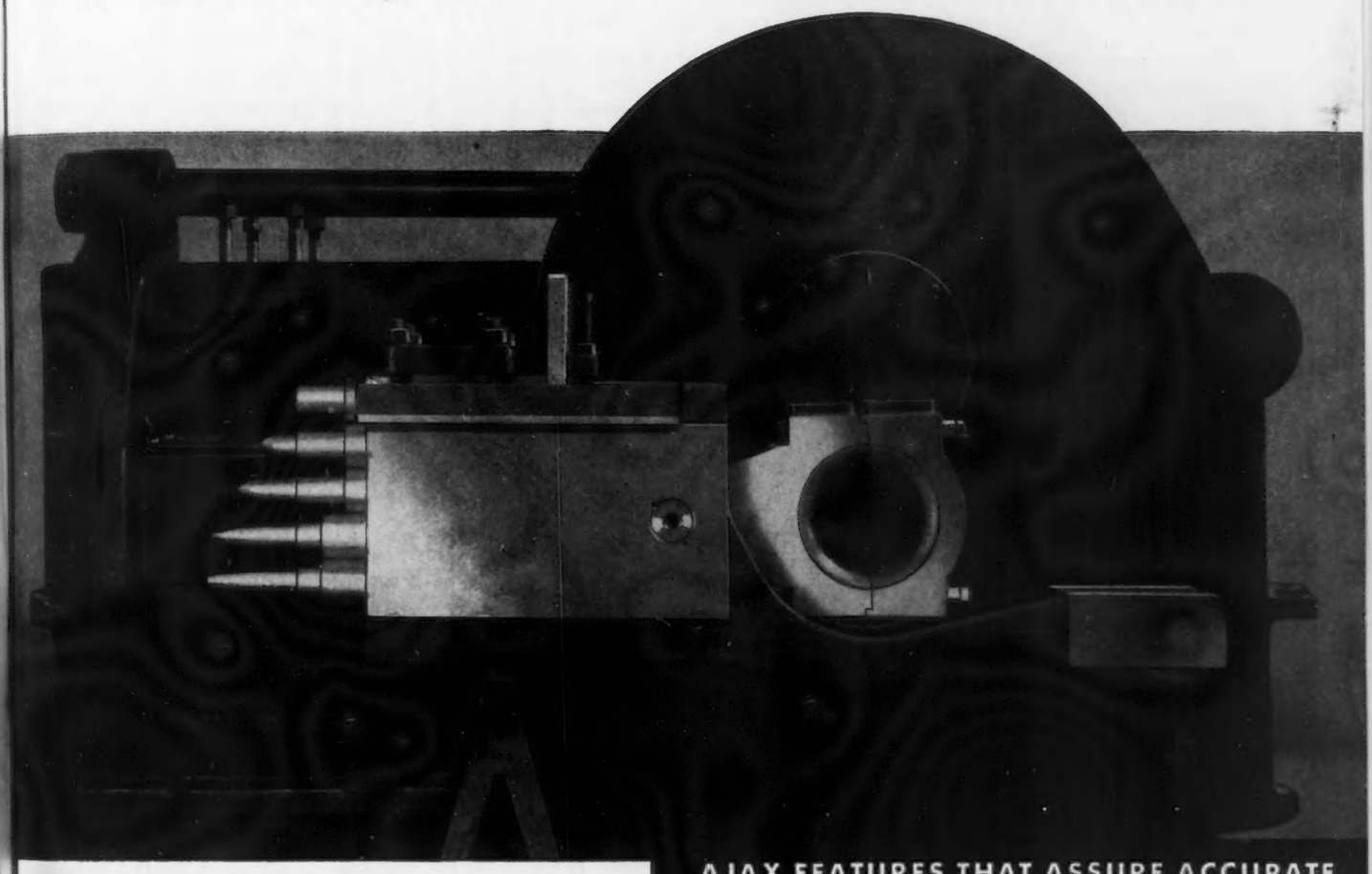
UNDEVIATING HEADER SLIDE ALIGNMENT IN *Ajax* FORGING MACHINES *assures accurate deep piercing* ON A HIGH PRODUCTION BASIS



BECAUSE of the greater overall bearing length of the underarm extension guided header slide, Ajax Air Clutch Forging Machines maintain a high rate of production on forgings requiring internal displacement and deep piercing. The underarm header slide extension guides the multiple progressive piercing tools into the die impressions, accurately centered in the partially pierced forgings, despite tremendous off-center pressures developed in multi-stage dies with operations far above and below the center line. The result is uniform-walled and close-concentric forgings, and longer piercer life with a minimum of piercer breakage. These exclusive advantages of Ajax Forging Machines result from combining the features of mechanical soundness identified in the check-list.

Write for Bulletin No. 65-B.

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✓	Guided by side liners the full height of the header slide body with right hand liner adjustable by locking screw plugs to compensate for out of parallel wear and to maintain proper running fit at forward end of stroke.
✓	Extended guide bearing guided all four sides at neutral location in continuous housing bed frame, free from deflection.
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G-M Sees Foremen's Union as Dangerous

Detroit

• • • **General Motors Corp.** has entered a vehement protest against the organizing campaign of the Foremen's Association of America in its Detroit plants.

The Foremen's Association, an independent union, has recently signed a contract with the Ford Motor Co. and won a bargaining election at the Packard Motor Car Co. Approximately 20 petitions for elections in various Detroit plants have been filed with the NLRB in Detroit. One of these petitioned for certification as the exclusive bargaining agent for all foremen employed by the Detroit Diesel Engine Div. of General Motors Corp.

The General Motors protest was based on the argument that foremen are management representatives and that unionization "will imperil their ability to fulfill their responsibilities and maintain efficiency and discipline of the men under their direction."

The inference in another section of the G-M protest was that conceivably the Foremen's Association, or any other supervisors' union, might affiliate with the same central labor bodies which control the rank and file of the workers, which would make a most difficult situation for management—or might affiliate with an opposite group, leading to jurisdictional disputes.

The Foremen's Union claims approximately 12,000 members, including plants outside of Michigan as well as in Detroit. Organized in September, 1941, the group signed its first contract about six weeks ago, providing standardized wage scales for foremen in Ford plants and settling other grievances. A contract with Packard is now in negotiation, it is understood.

5% Increase in 15% Pay Formula Seen Gov't. Answer

Washington

• • • **With Presidential** intervention received in the coal contract negotiations and with CIO's moves toward a pay increase which would break the "Little Steel" wage formula, observers here are anticipating a Presidential directive to the WLB raising the present wage yardstick of 15 per cent over Jan. 1, 1941 levels by 5 per cent, thus setting a fromula presumed to be in conformity with the rise in the cost of living. Some observers believe that this increase may be enforced instead of acceding to the present union demands.

Wage Rise Hits Nine More Ore Mines

• • • **A 5½c. per hour** general wage increase and a maintenance of membership clause for more than 20,000 employees of nine iron ore companies owning more than 90 mines in the Lake Superior region was ordered last week by NWLB. The employees are members of the USWA-CIO.

The wage increase, which was made retroactive to July 13, 1942, was previously granted to approximately 1700 employees of the Oliver Iron Mining Co., a U. S. Steel subsidiary.

FROM quartz crystals to tank turrets there's scarcely an article used by our armed forces on which some type of abrasive is not used. Grinding, polishing, buffing and lapping are essential operations in practically every war plant. And the Abrasive Manufacturers of the U. S. A. are working 24 hours a day making sure that not a single piece of vital material is held up through lack of abrasive grains.

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One of the largest manufacturers of abrasive grains, the General Abrasive Co., is 100 per cent converted to war production. Some day these tough, uniform abrasives will again be available for production of our civilian necessities but until that day arrives, they grind and polish only for Mars.

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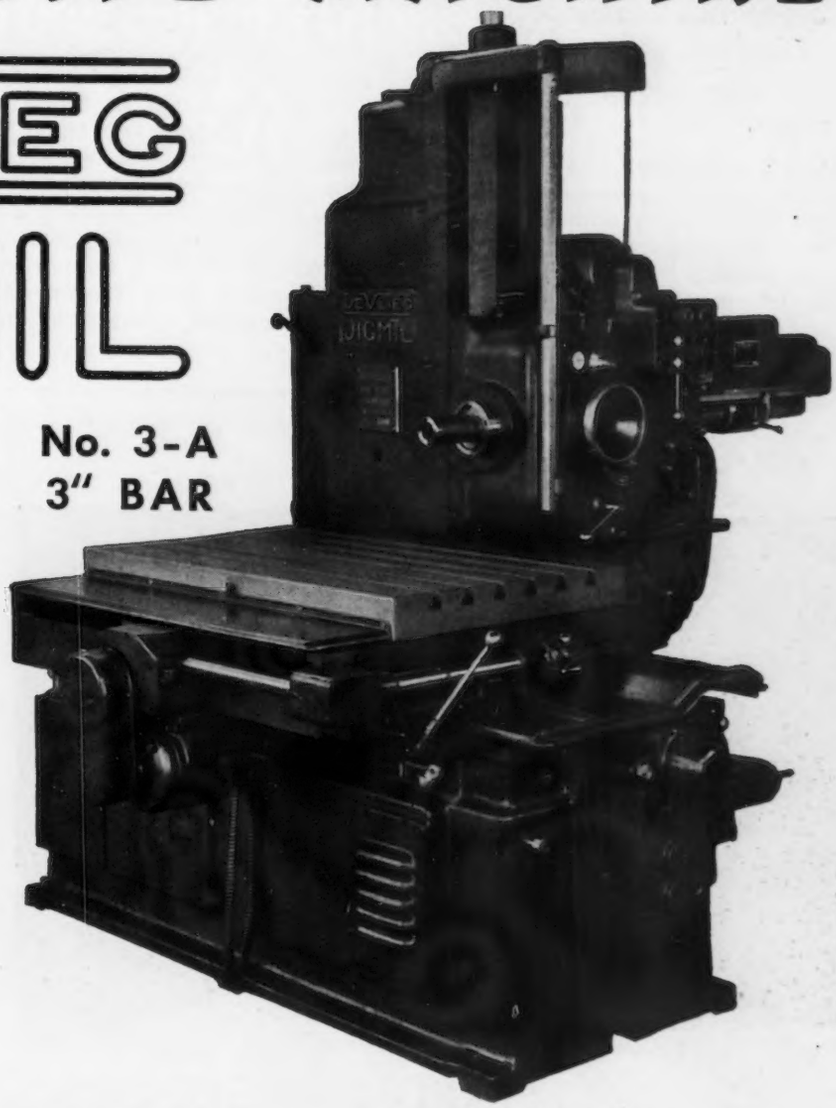

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Steep Rock Finances, Marketing Program Are Concluded in Canada

Toronto

• • • **Steep Rock Iron Mines, Ltd.,** has completed financing arrangements and is proceeding with development work for the purpose of bringing its iron property in the Atikokan section of Ontario into production before the end of 1944. A program also has been concluded for the marketing of the Steep Rock high grade iron ore.

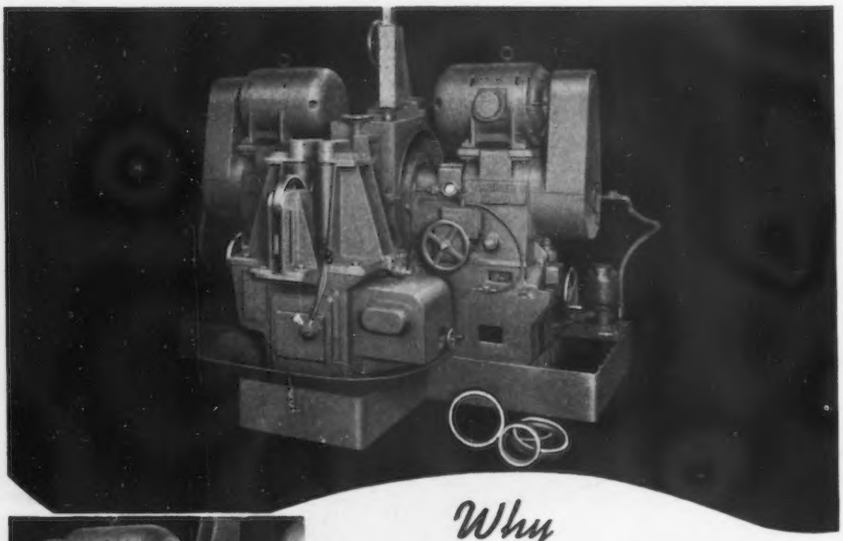
D. M. Hogarth, president, announced that the financial arrangements provide a total of $7,025,000 U. S. funds, equivalent to $8,727,500 Canadian at the present rate of exchange, of which $5,000,000 U. S., (bearing 4 per cent interest) is provided by the Reconstruction Finance Corp., and $2,125,000 is the proceeds of a debenture issue, (bearing 5½ per cent interest), provided by Otis & Co., of Cleveland. Provision also has been made for a further $1,000,000 Canadian funds, to be furnished by the company's sales agent, if required. Under the new financing agreement the company will retain control of the management of the property.

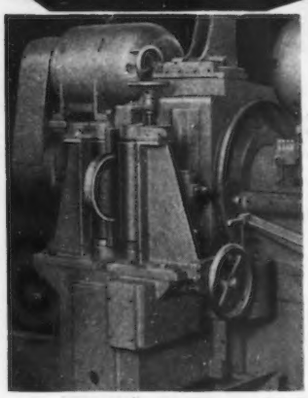
A sales contract has been entered into which provides for the sale of 10,000,000 tons of ore over the first 10 years of production. It is not, however, intended that sales shall be limited to this amount. The company will retain control of its sales policy.

Completion of the above arrangements have involved the giving up of approximately 37 per cent in the future potentialities of the company. The carrying out of these arrangements has necessitated the increase of the company's capitalization from 5,000,000 to 6,000,000 shares, of which approximately 5,400,000 will now be outstanding.

The new program of development for the Steep Rock property has been under way since early in the year. Plans call for installing a plant with capacity of 2,000,000 tons per annum.

ALL A-GOGGLE: Free distribution of safety glasses for workers, undertaken at the U. S. Naval Ordnance Plant operated by Hudson Motor Car Co., is aimed to reduce further already low accident frequency rates enjoyed by the plant. A "goggles cart" goes through every department, with a girl operator suggesting the use and need for safety glasses, taking fittings, and receiving orders at cost for prescription-type glasses when required.





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TAKE a "tip" from the bearing industry, in which practically EVERY plant operates from one, to a battery, of Gardner PRECISION Double Grinders like the one illustrated here.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

It is expected to attain initial production in 1944.

One of the most important single factors in the future of the company is an association which provides assurance of large tonnage sales for the ore at market, rather than at wholesale of leased mine prices. In this connection, by arrangement with the company, Cyrus S. Eaton of Cleveland, and his associates, have organized in Canada, the Premium Iron Ores Ltd., to act as exclusive sales agent for the Steep Rock ores, and to render various other services deemed necessary by Steep Rock. The agreement with Premium Iron Ores Ltd., has been so drawn as to leave Steep Rock in control both of production and sales policy. The principal provisions of the agreement are summarized as follows:

1. Premium undertakes to sell 10,000,000 tons of Steep Rock ore during the first 10 years of production, at the full, going market when sold, with a minimum of 500,000 tons in any full season.
2. Premium undertakes to handle all shipping, rail transportation and freight insurance at competitive rates and to make collections and pay Steep Rock the full market price of the ore less the above disbursements and a sales commission of 2 per cent.
3. Premium undertakes to advance to the company $1,000,000 to be used for construction, interest during construction, or working capital, should such be required in addition to the other finances to reach production.
4. Premium gives suitable guarantee of performance in respect to its undertakings as set forth in (1), (2), and (3) above.
5. Premium is expressly prohibited from handling any other iron ores.

In order to provide Premium with a participation in the future results of the joint efforts of the two companies, Steep Rock has sold to Premium 1,437,000 shares of treasury stock (in the form of Voting Trust Certificates) for a nominal consideration of 1 cent per share. These together with the 562,500 shares accompanying the debenture issue, amount in all to about 37 per cent of the total stock outstanding.

Production will be open hearth ore. The mines are estimated to contain upwards of 100,000,000 tons of the highest grade ore. Metallurgists have calculated that the proposed 2,000,000 tons of Steep Rock ore, minimum annual production planned by the company, will cut the steel industry's

Today her shears are Unishears
YESTERDAY her materials were gingham and taffeta.
After John joined his regiment, she wanted to help, too. A nearby airplane factory offered opportunity to help build fighting ships to protect John.
Today, her shears are Stanley Unishears . . . those clever metal cutting shears that follow the most intricate pattern in sheet metal. Fast, careful cutting takes on a new significance when she reads the combat record of the planes she helps to build.
Hundreds of thousands of others like her are helping to win the war of production. We are proud to be able to furnish the electric tools which in the skilled hands of women and men are speeding the day when all can return to their peaceful pursuits. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.
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HAMMERS
SAWS
DRILLS

NEW GEAR MANUFACTURING PROCESS: Details of a new gear manufacturing process which is said to eliminate practically all machining and save half the steel normally needed per gear will be revealed at the American Society of Tool Engineers national meeting in Milwaukee March 25-27. Here, R. R. Nathan, chairman of the WPB planning committee (right), discusses the process with Willard F. Rockwell, board chairman of Timken-Detroit Axle Co., where the new process was developed. Mr. Nathan holds one of the new gears and one of the steel slugs from which the gears are produced to finished size in giant forging presses. Mr. Rockwell holds the same type gear and large blank from which they were previously machined.

scrap requirements by 9,000,000 tons.

Following earlier discussions with the Cyrus Eaton group in the United States, extensive negotiations were carried out with the governments concerned in the two countries.

The Canadian Government agreed to advance Canadian National Railways the cost of constructing the spur line and the docks, thus relieving Steep Rock of an estimated capital expenditure of some $2,500,000. In addition the Government agreed to provide a subvention on the freight rate, amounting to 20 cents a ton on the first 5,000,000 tons handled or total of $1,000,000 in order to furnish the company initially with a competitive inclusive rate. Through the cooperation of the Ontario Government, the Hydro Electric Power Commission and the Ontario-Minnesota Pulp and Paper Co. Ltd., the problem of power, including the closing down of the Moose Lake Power plant at Steep Rock Lake, was solved. Subsequently a further agreement was entered into between Steep Rock and the Hydro Electric Power Commission, whereby the latter undertook to finance the cost of building a power line to Steep Rock from Port Arthur, and to waive the customary deposit, resulting in a saving to Steep Rock in capital outlay of approximately $1,600,000.

Satisfactory priority assistance has been granted.

Canadian Building to Be Cut to Minimum by Summer

Toronto

• • • **Building construction** in Canada will reach an absolute minimum by mid-summer, but public utilities already are perturbed as to the source of new, necessary electrical equipment, M. J. McHenry, priorities officer, Hydro Electric Power Commission of Ontario, declared at the recent annual meeting here of the Ontario Electrical Contractors' Association. Further restrictions will be forthcoming immediately whereby builders will not be allowed to install wiring or rewiring unless the building owner has made such clearances as will guarantee his receiving utilities services, Mr. McHenry added.

"I find it impossible to keep up with all current restrictions and with the law, but there will be further restrictions soon. Today there is not sufficient coordination among the utilities and we do not know where we stand. We would like to know where we can get releases at one place instead of 50.

Censorship Lifted From Armor Plate Mill

Gary

• • • **Censorship** which has blanketed the huge armor plate mill operated here by Carnegie-Illinois Steel Corp. for the Army was moved aside for the first time last week when members of the press were permitted to inspect the plant.

The mill, which adjoins Carnegie-Illinois' Gary works, covers 53 acres of ground, of which 26 are under cover. The plant was built at the request of the Army and is its property. It was erected as a joint project of the Army engineers and Carnegie-Illinois and is operated by the company.

An innovation in construction of the plant is the utilization of asbestos board for both roofing and siding material.

Armor plate rolled here is used for armoring tanks, combat vehicles and other ordnance equipment.

FORGINGS THAT GAIN TIME

Confronting all of us today is the supreme task of making time, because it is such a vital element in the strategy of modern warfare. T & W makes forgings that gain time—time that results in more war production at a faster rate. Plus or minus a few minutes of time at any stage in forming a forging may gain hours in the length of time it takes to get the forging onto your assembly line. T & W Forgings usually require less machining and finishing and that's where they gain time for you. Ask a T & W Forging Engineer about forgings that gain time.

T & W FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY

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STEEL FORGING CORPORATION · ALLIANCE, OHIO

Sales Offices in New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

CMP . . . 1944 Allotments to be Made;

Washington

• • • **Although the criticism** aimed at CMP by the Automotive Council for War Production was softened last week by WPB insistence, the fact remains that CMP is under fire. Courtney Johnson, ex-chief of the CMP Information Branch at WPB, and who is now Chairman of the ACWP Material Control Committee, told a press conference last Friday that "there has been a complete misinterpretation of the automotive industry and its letter."

Mr. Johnson had been invited to attend the conference which was called by WPB chairman Donald M. Nelson and executive vice chairman Charles E. Wilson. The conference followed a meeting between WPB officials and the Automotive Council's Material Committee to discuss charges made by the Committee in a letter to 500 ACWP members and several WPB officials. Content of the letter was disclosed in a recently published column in the daily press. It is assumed that ACWP officials were persuaded in the interests of saving CMP to practically retract the letter.

Lack of balance between authorized schedules and quantities of materials allotted for these schedules; split preference ratings issued with allotments; allotments delayed beyond practical time limit for placing "delivery orders" for the second quarter; allotments are being received for only the second quarter, whereas the rest of 1943 and even the first quarter of 1944 are needed now for items of long time procurement.

An intimate view of the CMP criticism issued last week by the Automotive Council for War Production is contained in this week's Assembly Line on page 72.

The letter said that a summary of replies received representing 256 plants in 27 states showed that 78 had received no allotments; 86 had received partial allotments; 53 had received balanced allotments; 23 had received unbalanced allotments; 16 replies were unspecified, and 87 plants reported split preference ratings.

The letter stated that it is obvious from the replies that most of the plants of the industry will find it impossible, without major and immediate adjustments in allotments and ratings, to complete present second quarter schedules.

"For instance," the letter said, "a schedule for 1000 units in April with an allotment of material for 500 units is obviously incapable of attainment. A schedule for 1000 units which has been allotted 1000 units of alloy steel, but only 380 units of aluminum will surely permit only an output of approximately 38 per cent of the desired schedule. But even worse than this, it will promote receipt of unusable excess alloy steel to the extent of 62 per cent of the schedule. Since the original schedule of 1000 units has not been cut, the manufacturer may continue to accept deliveries of

FORM CMP-4B (3-9-43)

UNITED STATES OF AMERICA
WAR PRODUCTION BOARD

BUREAU OF THE BUDGET NO. 13-R780.1
APPROVAL EXPIRES JUNE 30, 1943

REFERENCE NO. | NO. OF DIRECT SECONDARIES INCLUDED:

PRODUCT TO BE MADE BY APPLICANT AS LISTED IN CMP CLASS B PRODUCT LIST:

APPLICATION FOR ALLOTMENT OF CONTROLLED MATERIALS FOR CLASS B PRODUCTS

APPLICANT'S OWN DESCRIPTION OF PRODUCT TO BE MADE

NAME AND ADDRESS OF APPLICANT

NAME, ADDRESS, TITLE OF YOUR COMPANY REPRESENTATIVE

SECTION A - PRODUCTION SCHEDULE

UNIT OF MEASURE (See instruction sheet)	JULY 1943	OCTOBER 1943	JANUARY 1944	APRIL 1944
	AUGUST 1943	NOVEMBER 1943	FEBRUARY 1944	MAY 1944
	SEPTEMBER 1943	DECEMBER 1943	MARCH 1944	JUNE 1944
TOTALS				

SECTION B - PURCHASE SCHEDULE

LINE NO.	CONTROLLED MATERIALS (1)	CMP CODE (2)	UNIT OF MEAS. (3)	TO BE PUT INTO PRODUCTION 3RD QUARTER 1943 (4)	REQUIREMENTS 3RD QUARTER 1943 (5)	4TH QUARTER 1943 (6)	1ST QUARTER 1944 (7)	2ND QUARTER 1944 (8)
1	CARBON STEEL (INCLUDING WROUGHT IRON)	2001-2061	SHORT TONS					
2	ALLOY STEEL	2501-2561	SHORT TONS					
3	COPPER & COPPER-BASE ALLOYS BRASS MILL Cu-BASE ALLOY PROD. SHEET AND STRIP	3011	LBS. OF ALLOY					
4	RODS, BARS AND WIRE, INCLUDING EXTRUDED SHAPES	3021	LBS. OF ALLOY					
5	TUBING AND PIPE	3041	LBS. OF ALLOY					
6	BRASS MILL COPPER PRODUCTS	3041, 3061, 3071	LBS.					
7	WIRE MILL COPPER PRODUCTS	3101	LBS.					
8	FOUNDRY COPPER AND COPPER-BASE ALLOY PRODUCTS	3201	LBS.					

REVISED FORM: **Manufacturers of Class B products are being advised to apply for materials under the revised Form CMP-4B, shown here and on the facing page. This form will be used not only through the remainder of the present year but also for the first two quarters of 1944. The official list of B products as issued Dec. 21, 1942, will not be changed for third quarter of 1943. One application is to be filed for each class of products. Firms should be sure that applications covering each Class B product include all controlled materials for the manufacture of B products unless specifically authorized. Applications on Form CMP 4-B must be filed with WPB by April 15 to insure distribution for third quarter of 1943.**

Split Ratings Termed Needed . . .

the alloy steel as long as he sees any hope, however remote, of getting the right amount of aluminum. Thus, not only will this excess alloy steel be of no use to this program, but it will have been taken away from other programs not requiring steel.

"Not only is it impossible for a manufacturer to build a schedule when allotments are out of balance, but it must be realized that according to CMP only one third of the steel and copper, and only 30 per cent of the aluminum allotted, can be used during the month of April, thus requiring immediate reduction of schedules on April 1."

The letter said that any attempt to adjust inventories by the reduction of alloments was contrary to CMP principles, and it was added that allotment reductions only result in a seriously unbalanced material situation for most companies and immediate reduction in schedules.

9	ALUMINUM ROD, BAR, WIRE AND CABLE	4021-4121, 4151	LBS.						
10	RIVETS	4122	LBS.						
11	FORGINGS, PRESSINGS AND IMPACT EXTRUSIONS	4171, 4701	LBS.						
12	CASTINGS	4202-4218	LBS.						
13	SHAPES, ROLLED OR EXTRUDED	4251, 4301, 4311	LBS.						
14	SHEET, STRIP, PLATE, AND FOIL	4351, 4361, 4601	LBS.						
15	TUBING	4401, 4411	LBS.						
16	INGOT AND POWDER	4501, 4801 4811	LBS.						

SECTION C – SHIPMENTS ANALYZED BY PREFERENCE RATING AND CLAIMANT AGENCY

CALENDAR QUARTER	TOTAL		GIVE FIGURES IN THOUSANDS OF DOLLARS												
	QUANTITY (1)	VALUE THOUSANDS $ (2)	AAA-AA1 (3)	AA2-X (4)	AA3 (5)	AA4 (6)	AA5 (7)	ALL OTHER (8)	ARMY (9)	NAVY (10)	AIR-CRAFT (11)	U.S. MARITIME COMM. (12)	BOARD OF ECON. WARFARE (13)	LEND-LEASE (14)	OTHER & UNIDENT. (15)
SHIPMENTS JAN-MAR 1943															
ESTIMATED SHIPMENTS APR-JUNE 1943															
ESTIMATED SHIPMENTS JULY-SEPT. 1943															
RATED ORDERS ON HAND SCHED. FOR SHIPMENT JULY-SEPT 1943															

CERTIFICATION

THE UNDERSIGNED CERTIFIES TO THE WAR PRODUCTION BOARD THAT, TO THE BEST OF HIS KNOWLEDGE AND BELIEF, THE INFORMATION CONTAINED IN THIS APPLICATION IS CORRECT AND COMPLETE AND HAS BEEN PREPARED IN ACCORDANCE WITH THE CMP-4B INSTRUCTIONS, WITH WHICH THE UNDERSIGNED IS FAMILIAR.

NAME OF COMPANY

DATE

SIGNATURE OF AUTHORIZED OFFICIAL

SECTION 35(A) OF THE UNITED STATES CRIMINAL CODE 18 U.S.C. SEC. 80, MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

After citing relatively minor complaints, the letter added that there is a general complaint from many prime consumers and virtually all secondary consumers that they have not yet received all their allotments, and that even now the time is too short to procure materials under CMP procedures for April and May. In spite of this fact, the letter continues, steel mills are beginning to advise some manufacturers that they must soon refuse further orders for the second quarter because their capacity already is just about taken up by orders bearing allotment numbers.

At the conference, Mr. Johnson said that programs for remedying the unbalance between allotments and authorized schedules have been discussed, and that he believes the situation can be cured.

Mr. Nelson interjected at this point saying that split ratings are necessary because of the relative urgency of specific amounts of items within a given production area. For example, he pointed out, the Army may desire a given amount of a specific item to be on the fighting front at a particular time. High preference ratings would be required for this. It may, however, be desirable for additional amounts of the same article be made available for training purposes. In which case, the training items would be given a lower preference rating. Mr. Nelson also said that the experience of the automotive industry in production problems has been such that WPB considers its comments and views invaluable.

In connection with the ACWP criticism on the lack of extension of allotments, Mr. Johnson next said that the CMP Division now has plans to extend the allotments for the balance of 1943 and the first quarter of 1944. He indicated present understanding as to why it has not been done to date.

•

Split Ratings Discussed by Krug

Washington

• • • **A. J. Krug,** program vice-chairman of WPB, has sent instructions to all prime consumers of controlled materials, explaining what steps are to be taken to eliminate split ratings. These instructions were written to accompany a notification to the prime consumer that his application for needed materials has been approved. This was one of the points discussed by the Automotive Council for National Defense in its bill of complaint.

Regarding preference ratings Krug said, in Section B of Form CMP-4B one or more preference ratings have been assigned for use in acquiring production materials (other than controlled materials) required to fulfill the related production schedule.

If you receive two or more ratings, you must exclude all your requirements for controlled materials to be purchased with the allotment in determining the proportion in which the split ratings are to be applied. You should then use the different ratings

in proportion to the total dollar amount of your orders.

For example, a consumer receives a preference rating of 50 per cent AA-1 and 50 per cent AA-3 for use with his authorized production schedule. His total requirements of production materials for the authorized production schedule in the quarter are $200,000. Of this, $100,000 represents controlled materials which he will acquire by placing authorized controlled material orders. These are to be disregarded in determining the extent to which each rating may be used since ratings will not affect the acceptance and delivery of these orders.

This leaves a balance of $100,000 of which $50,000 may be rated AA-1 and $50,000 AA-3. He may apply split ratings to his suppliers or he may rate some suppliers' orders AA-1 and others AA-3, or he may use any combination of the two ratings so long as the total amount bearing either rating does not exceed $50,000.

IN THE POST-WAR era hundreds of plants will rush to secure cleaning equipment *especially designed* and engineered to do the job or series of jobs required.

If your plant is producing metal products for war there is no need to wait. You can secure *right now* for your present operations the "post-war" miracle of an A-F Cleaning Machine *especially designed* and incorporating every modern feature.

An example is this A-F equipment for high-speed cleaning, rinsing and drying miscellaneous airplane castings. With 36 in. wire mesh conveyor, this A-F equipment cleans and dries all types of castings up to 17 x 36 inches in size. . . . Other *especially designed* A-F equipment for cleaning many other types of metal war products. Whatever your cleaning problem, let our experienced engineers solve it for you or, without obligation, write today for folder "Yes, All Metal War Products Must Be Cleaned."

The ALVEY-FERGUSON COMPANY
715 Disney St., CINCINNATI, OHIO

CONVEYING EQUIPMENT
A-F CONVEYING MACHINERY
Alvey-Ferguson
METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

Steel Orders in Process April 1 Clarified by WPB

Orders for steel having preference ratings which cannot be shipped prior to April 1 will not necessarily be replaced simply because at that time allotments made under CMP will take precedence. Because the mills have been notified that they must fill allotment-numbered orders first, some confusion has arisen about what will be done with preference rated orders. The Steel Division has notified the mills that an order that has been started in process need not be set aside because of this change-over.

A circular issued by the Steel Division says:

There has been some misunderstanding of the instructions contained in my letter dated Feb. 25 regarding the use of allotment numbers and priority ratings under CMP. This letter stated: "Between April 1 and June 30, both inclusive, you shall fill allotment numbered orders first, ..." This statement was not intended to change any of the provisions of CMP Regulation No. 1 with respect to the time for placing authorized orders as outlined in Schedule III in Regulation No. 1.

This means that if an order is in your schedule for shipment in April it should be validated as an authorized controlled materials order upon receipt of a properly specified allotment at any time prior to shipment. It does not mean that you must accept an allotment covering a new order or an order which has not been scheduled, and ship in a shorter time than specified in Schedule III, unless this can be done without disruption of your schedules. In other words, if steel for a particular order has been started in process, it is not necessary to divert such steel from this order, even though the order has not at that time been validated by the assignment of allotment numbers.

•

MRO Supplies for Agencies Under CMP Regulation No. 5

• • • **Procedures for** obtaining maintenance, repair and operating supplies after March 31 for Governmental agencies and private institutions were provided by WPB last week by the issuance of CMP Regulation 5A. The regulation assigns an allotment symbol, MRO-5A, and preference ratings of AA-1, AA-2X and A-10 for use by the group it covers.

CMP Construction and Facilities Outlined

• • • **To clarify** the situation with respect to deliveries of controlled materials for construction projects and plant facilities pending the issuance of formal regulation No. 6 under CMP, the WPB last week made public a notice explaining that in general, authorization to obtain controlled materials will be handled by the various Claimant Agencies to whose jurisdiction the projects have been assigned. Contractors handling the projects have already been notified of these assignments to claimant agencies.

The issuance of proposed CMP Regulation No. 6 covering procedures for obtaining controlled materials for construction and facilities under CMP has been postponed pending a revision of processing procedures and standardization of forms.

All current construction jobs authorized in accordance with WPB orders prior to Feb. 17, 1943, have been assigned to individual Claimant Agencies. Claimant Agencies have contacted jobs under their jurisdiction, requesting applications for controlled materials. The following forms are being used: Form CMP-OCE No. 1—War Department; CMP-14, CMP-15 and CMP-4C—Office of Civilian Supply; Forms CMP-16, CMP-17 and CMP-4C — Facilities Bureau; and Form CMP-4C—All other Claimant Agencies.

In the case of construction projects authorized subsequent to Feb. 17, 1943, instructions will be issued to the consumers involved indicating the Claimant Agency to which applications for controlled materials are to be directed and the specific application forms to be used. Applications for authorization to construct will, until further notice, be made in accordance with existing procedures.

Batcheller Calls For May and June Plate Schedules

• • • **H. G. Batcheller,** director of the WPB Steel Division, in a circular letter issued last week to all steel plate producers outlined the need for a more detailed report of plate schedules for the months of May and June and gave specific instructions about scheduling to capacity. His letter in part stated:

"Your practice and procedure governing the acceptance of orders for plates for shipment during May and June shall be in accordance with CMP Regulations and shall be limited in total tonnage each month to 110 per cent of your production directive figure.

Orders with properly endorsed CMP Allotment Numbers received by you prior to the closing date shall be given preference over orders without Allotment Numbers. If you do not receive sufficient authorized CMP orders for plates, you may accept preference rated orders requested on Form PD-298 for the balance of 110 per cent of your production directive figure.

Shipments against your customers' orders are to be made strictly in accordance with schedules as approved and returned on Form PD-169, subject to such adjustments as subsequently may be directed by us.

Submit plate schedules on Form PD-169 for the months of May and June, assembled and mailed in time for receipt by the War Production Board not later than the 12th of the preceding month.

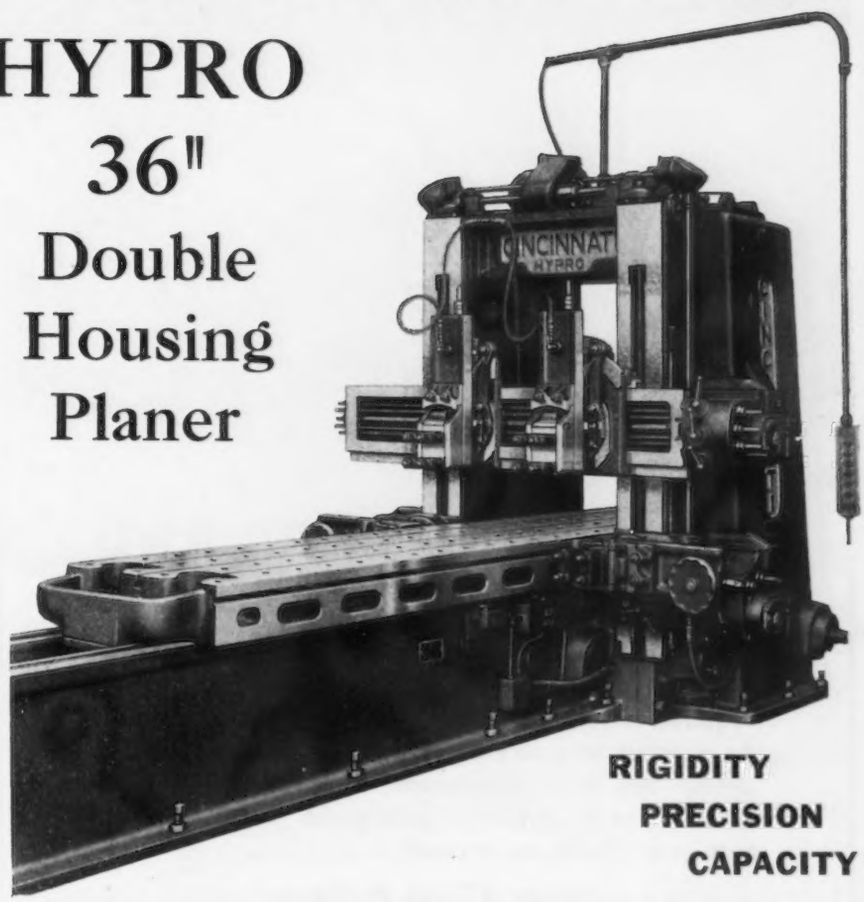
Do not list anything in the "OUT" Column. In the "IN" Column, list only the orders you have accepted prior to the closing date to a total of 110 per cent of your production directive."

Cincinnati

HYPRO

36"

Double Housing Planer



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• Heavy cuts are made possible through the use of a heavy, full-depth, box-arch mounted between extra length, pyramid type housings. This provides rigidity, eliminates twisting under heavy cuts and assures accuracy under all conditions.

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THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

WPB Standardizes Steel Plates; Cuts Specifications to 25 NE Types

Washington

• • • **Effective immediately,** WPB on Monday issued Schedule 8 to Order L-211 establishing standard specifications for carbon steel plates, and reduced the number which may be produced from several hundred to approximately 25. While a large percentage of the current production of carbon steel plates is in conformance with the provisions of the schedule, it was stated that the elimination of special and other non-essential specifications is expected to result in a substantial addition to the productive capacity of the industry. Production of carbon plates, used largely for the construction of ships and also for army equipment, railroad cars, pressure vessels, welded pipe and boilers, amounts to about 12,000,000 tons annually or almost 20 per cent of the production of all semi-finished and finished steel products.

The schedule was developed by the WPB National Emergency Steel Specifications Technical Advisory Committee, which is composed of representatives of both producing and consuming interests and representatives of the military services. Selection of specifications covering carbon steel plate uses of the armed forces was made by the services involved. Commercial specifications were chosen from those having the widest distribution and use.

The schedule provides that no person shall produce or deliver on a Government order any carbon steel plate which does not conform to a specification included in List 1 or List 2 of the schedule. List 1 covers specifications permissible for general use. List 2 covers specifications permissible for Government orders only. Production or delivery for other orders must conform to specifications included in List 1. Carbon steel plates which were produced or fabricated prior to issuance of the schedule or so processed prior to the order that conformance to the specifications would be impracticable, it was stated, and were exempted from the restrictions.

National Emergency specifications for steel products have already been put into effect for concrete reinforcing bars (Schedule 1); steel wheels and tires (Schedule 2); barbed wire, wire fence (Schedule 3); structural steel shapes (Schedule 4); steel axles and forgings (Schedule 5); mechanical steel tubing (Schedule 6); and rails and track accessories (Schedule 7).

•

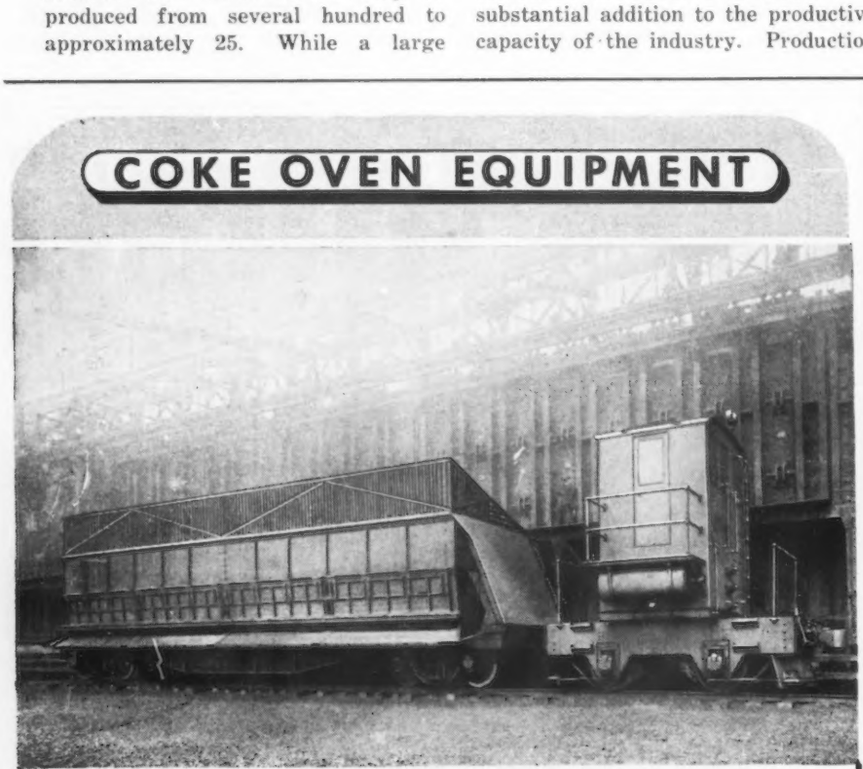
Allotments of Small Orders

CMP Bulletin No. 23, issued last week, directs the various claimant agencies to allot controlled materials in small lots where those materials are required by the manufacturer in the production of Class A or Class B products. These permits must be issued even though the manufacturer actually requires no new material shipped to him, but will take the quantity required out of his inventory.

CMP Bulletin No. 23 reads as follows:

Applications filed by consumers who

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars
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Electrically Operated Cars for Every Haulage Purpose

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•
Turntables

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

Suspension Orders Few

Washington

• • • The number of suspension orders issued to date is surprisingly small in relation to the thousands of companies surveyed for compliance with War Production Board priority regulations, W. John Logan, director of the Compliance Division, reported last week.

Nearly 75,000 investigations have been made which resulted in 247 suspension orders and 59 criminal prosecutions. In only one criminal case was a prison sentence imposed. A considerable number of the total cases revealed violations of a technical nature which had not impeded the war effort.

require small amounts of controlled materials or who require no controlled materials for a particular quarter, as may occur where the applicant can meet his requirements from inventory, will be processed as follows: Assign such applicant an allotment number and preference rating for use in obtaining production materials for the manufacture of the Class A or Class B products covered by the application.

•

Class B List to Stand Throughout Third Quarter

• • • WPB has let it be known this week through a circular letter addressed to all manufacturers of Class B products that the Class B Product list, while under revision, would not be reissued immediately and would be in effect throughout the third quarter. Meanwhile manufacturers of Class B products are being advised to make applications for controlled materials on the revised Form CMP-4B which will be used through the remainder of this year and for the first two quarters of 1944. (A replica of the revised CMP-4B form can be seen on pages 118-119 of this issue.)

•

Metal Window Rule Eased

Washington

• • • Restrictions on the sale and delivery of completely fabricated metal windows in distributors' and manufacturers' inventories were removed last Thursday with issuance of Order L-77 as amended. Heretofore, a rating of A-10 or higher was required for sale or delivery of these products. The amended order also changes the basis for manufacture of such windows. Previously they could be produced under a preference rating of better than A-2. Hereafter, a rating of AA-3 or higher will be necessary. This change brings the order in line with present rating patterns.

•

P-120 Revoked April 1

• • • Order P-120, assigning preference ratings to be used by producers of aluminum and magnesium to get maintenance and repair materials will be revoked April 1 WPB said on Monday. CMP Regulation No. 5 covers maintenance, repair and operating supply needs of aluminum and magnesium producers, hence the revocation.

•

Hand Tools Simplified

• • • Further simplification of forged axes, hatchets, adzes, broad axes and light hammers was effected by WPB through issuance of Schedule II to Limitation Order L-157 as amended. The order goes into effect April 15, 1943.

"Technical Progress" of direct fired warm air heating

IS REPORTED IN THESE THREE PAPERS*

...may we place them on your desk?

THESE PAPERS contain interesting technical detail on the functioning of direct-fired self-contained warm air heaters which will be valuable to those who are responsible for the heating of service buildings, industrial plants and other large structures.

Development and Performance of a Coal-Fired Unit Heater
Presented at the Annual Meeting, New York, N. Y., November 30-December 4, 1942, of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

Design and Performance of a Direct-Fired Unit Heater
Reprinted from *Heating, Piping & Air-Conditioning* magazine, January 1942.

Heating Industrial Buildings with Direct-Fired Units
Reprinted from *Engineering News-Record.*

A request will bring them to you by return mail.

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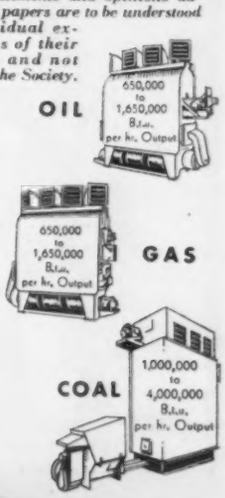
* Note: *Statements and opinions advanced in papers are to be understood as individual expressions of their authors and not those of the Society.*



DRAVO DIRECT FIRED HEATERS

This Week's Priorities and Prices

Steel warehouses and producers have been issued a circular of instructions permitting a temporary rebuilding of stocks of warehouses of certain commodities and enumerating limitations placed on sale of such products out of warehouses. (PDL-1891)

Aluminum plant scrap segregation has been placed under closer control in amended order M-1-d. (WPB-2854)

Chrome ore sales for the stockpile of the Metals Reserve Co. are not subject to price control under Amendment No. 1 to Maximum Price Regulation No. 258. (OPA-T-666)

Milling, smelting and refining of copper, lead and zinc ores are removed from control and under the General Maximum Price Regulation by Amendment No. 15. (OPA-1956)

Zinc oxide consumers are relieved of the necessity of furnishing written inventory reports to suppliers under amended order M-11-a. (WPB-2875)

Carbon steel plate specifications, reducing the number which may be produced from several hundred to approximately 25, were established in Schedule 8 to Order L-211, Mar. 20. (WPB-2878)

■ ■ ■

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (*For example,* WPB-600 *means announcement* 600 *issued by the War Production Board.*)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

"M" Orders:

M-1-d...Amended order puts tighter control on the segregation of aluminum plant scrap (3-16-43).

M-11-a...Amended order eliminates necessity of inventory reports on zinc oxide (3-19-43).

M-21-b...Amended order deletes obsolete matter relating to past periods (3-15-43).

M-104...Amended order removes all quota restrictions on the manufacture of certain types of metal lids used to seal jars (3-15-43).

"P" Orders:

P-56...Amended order gives simplified procedure for purchase and delivery of mining machinery equipment and supplies (3-17-43).

"L" Orders:

L-49...Interpretation (3-20-43) clarifies that renovators of bedsprings and bedding products are not subject to restrictions of order.

L-53-b...Amended order modifies controls on distribution of repair parts for track laying tractors (3-20-43).

L-77...Amended order lifts restrictions on the sale and delivery of completely fabricated metal windows in distributors' and manufacturers' inventories (3-18-43).

L-211...Schedule 8 establishes standard specifications for carbon steel plates (3-20-43).

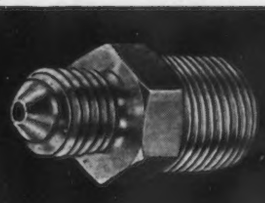
OUT OUR WAY
BY J. R. WILLIAMS
I STILL THINK I'VE BEEN OUT OF TH' GAME TOO LONG TO COME BACK TO IT AT MY AGE!
OH, NO, ALEC--WE NEED YOUR SKILLED HELP BAD AT A TIME LIKE THIS! YOU'LL FIND THINGS HAVE CHANGED SOME!
WHUT'S THE OLD BULL DOIN'? BRINGIN' 'EM BACK OFF TH' SHELF SO OLD THEY HAVE TO HOLD 'EM UP!
I WAS JUST WAITIN' TO SEE HIM TAKE HIS HANDS OFF THE OL' BOY! "THINGS HAVE CHANGED SOME"? ENOUGH SO HE'LL HAVE TO LEARN TH' TRADE OVER AGAIN! HE'S FORGOT MORE'N WE EVER KNEW, BUT IT'S BEST FORGOTTEN NOW!
SUPER SERVICE RADIAL
J.R.WILLIAMS
THE SHELF ROBBERS
T. M. REG. U. S. PAT. OFF. COPR. 1943 BY NEA SERVICE, INC.

The 'Old Bull's' right...

We've got one job to do...*win this war!* And the harder we work, and the better the products we turn out—the sooner we will be able to enjoy a sound, lasting peace. At the same time, the new skills and techniques we are learning as we produce for Victory—these will be utilized in post-war tomorrow to make this world a better place in which to live. We will be able to put precision on a mass production basis, which means finer, better-made products for *everyone.* And this, in turn, will mean jobs and security for our fighting men when they return home.

(*Below*) A few of the many thousands of our precision-made parts that help "Keep 'em flying and fighting."

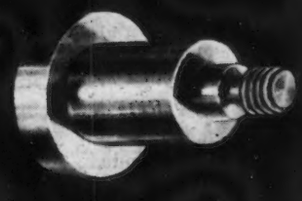
ERICSSON ESTABLISHED 1911



ERICSSON

SCREW MACHINE PRODUCTS CO., INC.

25 LAFAYETTE STREET, BROOKLYN, N. Y.



Action Taken to Aid Military Highway Work

Washington

• • • **To conserve** manpower, materials and machinery, WPB last week withdrew a blanket authorization which had permitted road departments to begin highway construction jobs provided no critical materials which had been acquired after May 6, were used. This authorization, which in effect gave road departments the right to build any roads where no priority assistance was required, was revoked so that equipment and materials tied up on some of these jobs might be diverted to the construction of important military and access highways.

Simultaneously, WPB delegated to regional directors the authority to permit the start of highway construction jobs costing less than $100,000 where Federal funds are not required and where no priority assistance is needed. Regional directors of WPB will exercise the authority after consultation with district engineers of the Public Roads Administration of the Federal Works Agency.

Since highway construction jobs costing more than $100,000 must come to the WPB for approval by the Facility Review Committee, these applications will be processed in Washington by the WPB Governmental Division. Similarly, roads requiring Federal funds must come to Washington for certification of their essentiality, so these applications also will be processed in Washington. This action delegating authority to the field to permit the beginning of highway construction is in line with the general WPB decentralization policy.

•

Canada Discontinues Three Sizes of Stove Bolts

Toronto

• • • **Production in Canada** of a number of sizes of stove bolts has been discontinued under an order by H. H. Foreman, Administrator of Fabricated Steel and Nonferrous Metals. The new order eliminates the following three sizes of flat and round head stove bolts, ¼ x ⅜; 5/16 x ½; and 5/16 x ⅝ in.

Export List Broadened

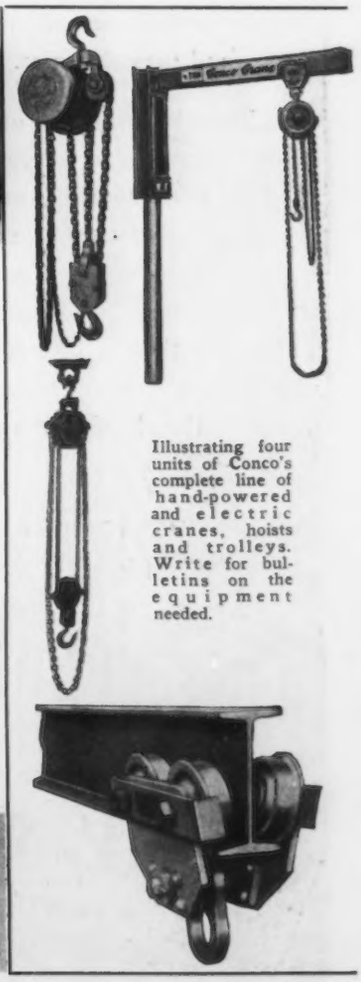
Ottawa

• • • **A number of iron** and steel products of Canadian manufacture, have been added to the list which are subject to the requirements of an export permit before shipment to any country, except where otherwise indicated. Iron and steel and their products (including alloy steel); bottle closures; safes and vaults, and equipment and parts thereof; needles; steel wool; lamps and lanterns. Nonferrous metals and their products; thorium manufactures, (including incandescent mantles); cerium manufactures. Miscellaneous; umbrellas and umbrella frames; pencils of all kinds, including mechanical; fountain and styllographic pens and parts thereof; rifles, revolvers and pistols, .22 calibre and smaller; shotguns and shotgun shells; musical instruments (including phonographs) parts and accessories; fishing rods and tackle.

However, no permit is required for shipment of rifles, revolvers, pistols, shotguns and shotgun shells, to the British Empire or the United States.

Here's Safe Easy Strength... FOR THE WEAKER SEX

The Conco Torpedo Electric Hoist has many features which adapt it ideally to operation by women. First, push button control allows for easy, one-hand operation. Double cast iron drums balance the load with a minimum of effort from the operator. An electric brake and positive limit switch are important safety features. Available for prompt delivery in 250-, 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Write for bulletins.



Illustrating four units of Conco's complete line of hand-powered and electric cranes, hoists and trolleys. Write for bulletins on the equipment needed.

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company

15 GROVE STREET, MENDOTA, ILLINOIS

out of sight means peace of mind!

The rugged, compact spring illustrated above is a vital part of the air-brake mechanism with which our mobile gun units are equipped. These carriers move rapidly and stop instantly. Guns go into action seconds faster . . . and *seconds* count.

These springs, like others of Holly manufacture, reach such perfection of craftsmanship that the adage "out of sight . . . out of mind" carries a new meaning for those who require unfailing performance. Read the headline again, then—

Write, wire or better still . . . phone us.

AMERICAN SPRING OF HOLLY, INC.
HOLLY, MICHIGAN

PRIORITIES

Mine Purchases Are Made Simpler by New WPB Order

Washington

• • • **A simplified** procedure governing purchases and deliveries of mining machinery, equipment and supplies for account of producers in all branches of the mining industry was announced last week by WPB with the issuance of an amended version of Preference Rating Order P-56. The purpose of the amended regulation, it was stated, is to dovetail the over-all equipment and materials requirements of the mining industry with the master pattern of industry operations under the CMP. Allocations of materials and equipment will be authorized from time to time for the mining industry as a whole in the light of mine operating schedules and total time production goals.

The new procedure is calculated to permit the orderly scheduling by manufacturers of any new equipment, repair parts, machinery and other materials allotted to the mining industry.

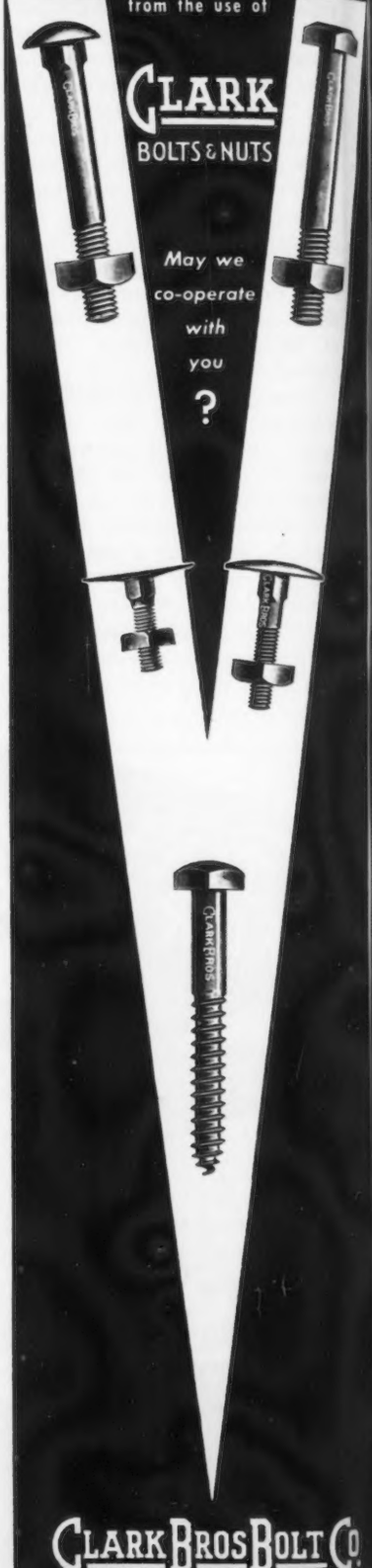
WPB will assign a serial number to each mine that is entitled to receive priority assistance under the terms of the amended order. Serial numbers will be assigned only to those mines that are engaged in essential war production. However, the Mining Equipment Division, which will administer the order, announced that all mine serial numbers now outstanding will remain in effect until further notice.

Producers holding serial numbers must regularly submit their requirements for maintenance materials, operating supplies and repair parts on the appropriate forms of the new PD-400 series. To obtain new mining machinery and other capital equipment, producers will be required to submit written applications describing the equipment and stating the reasons why it is essential for proper operation of the mine or plant.

The amended order provides a means of granting speedy preference rating assistance to mines in Central and South America through the agency of Mine Supply Control Districts that have been established in several Latin American countries by BEW. Foreign mines entitled to the preference rating assistance provided under P-56 as amended are those which are engaged in war production under agreements sanctioned by BEW.

To the extent that foreign mines are authorized to obtain supplies and equipment under the terms of the order, their requirements will be included as part of the program of materials allocations. Receipts and inventories of producers must be restricted to an amount not greater than the minimum necessary to sustain the current level of operations.

BUY BONDS
with
what you save in time, labor and worry from the use of
CLARK BOLTS & NUTS
May we co-operate with you ?



CLARK BROS BOLT CO.
Since 1854
MILLDALE, CONN.

PRICES

Machines, Parts Ceilings Set by Determining Plan

Washington

• • • **Substantially reducing** the number of reports and other administrative requirements, a new, simplified method for determining maximum prices of machines and parts produced in newly constructed or converted plants was announced last week by OPA.

Under the new method, manufacturers now will seek approval of a general price determining method to cover all their products rather than filing a proposed price for each machine and part produced in the newly constructed or converted plant.

After the price method is approved by OPA, the manufacturer may proceed to compute his ceilings in accordance with the accepted method without OPA's review of the price for each machine or part produced. However, manufacturers are required to file a report after six months so that OPA can review actual operation of the price method.

The action was taken in Amendment No. 71 to Maximum Price Regulation No. 136 (Machines and Parts and Machinery Services) effective March 24, 1943.

•

Chrome Ores Price Exempt To Dealers for Resale to MRC

Washington

• • • **Delivery of small** quantities of domestic chrome ore for the stockpile of the Metals Reserve Co. is encouraged by an amendment to its chrome ore price regulation by OPA.

The amendment, No. 1, to Maximum Price Regulation 258, Chrome Ores, effective March 24, provides that sales of domestic ore made to dealers who buy for resale are excepted from price control.

Prior to the issuance of this amendment sales, by small producers to dealers, were subject to price control. Since the Metals Reserve Co. is authorized to pay higher than the general maximum price paid by private users, the exception from price control of sales to dealers is necessary in order that the higher Metals Reserve Co. buying prices also accrue to the benefit of small and generally marginal producers. Resales by dealers to private users continue to be subject to price control.

ASK FOR THESE

They Show You How To Speed Up War Production

"Handling Racks To Speed Production"—Shows how to increase handling capacity, save on floor space, with efficient Union Steel Racks & Trucks.

• Check into Union Steel's many proved products for speeding up handling, making fullest use of manpower, reducing rejections. Send for any one or all of the bulletins shown here. WRITE TODAY, mentioning the numbers desired.

"Speed and Steel"—Describes Union Steel's excellent facilities for fabricating wire, sheet metal, angles and flat stock.

"Speed Up Handling"—6-page Bulletin on shot and shell baskets—a "must" for every shell manufacturer.

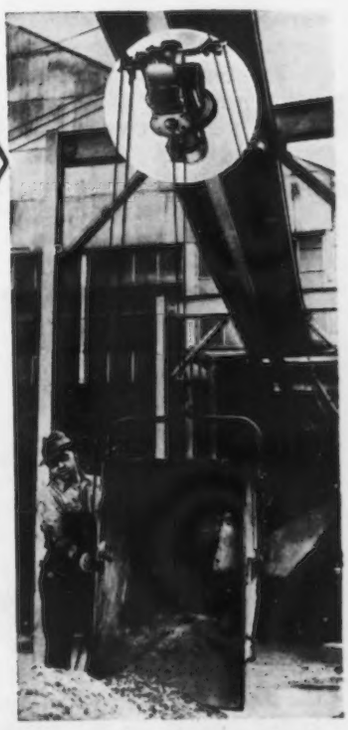
"Handling Baskets To Speed Production"—Shows types of baskets in wide use by war plants to eliminate lost time and increase efficiency.

UNION STEEL PRODUCTS CO.

442 Pine Street • ALBION, Michigan

On the Job

Over 3 Years —and no repairs!



THE PROBLEM: To increase boiler capacity without investing in new boilers and enlarging the building.

SOLUTION: The boilers were built down and fire box capacity increased. A ½-ton *Reading Electric Hoist* with built-in trolley was installed.

RESULT: Boiler capacity boosted ⅓ and ash handling speeded, without adding to the building.

When this **Reading Electric Hoist** *had been on the job for three years, the Plant Manager said, "We have had no repairs on the hoist, just regular oilings."*

READING CHAIN & BLOCK CORPORATION
2101 Adams Street, Reading, Pa.

ASK FOR your copy of "Modern Materials Handling Magic." A note on your company letterhead will start it on the way. 16 pages, 20 illustrations to help you get the equipment best suited to your needs.

READING CHAIN HOISTS-ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

Combination of Circumstances Blamed for Failure of "Schenectady"

• • • **Last week** the special sub-committee appointed by the American Bureau of Shipping to investigate the structural failure of the tanker Schenectady released a digest of its conclusions in which it summarized the failure of the hull structure as being due to a combination of unfavorable circumstances. The principal cause, the report states, "was an accumulation of an abnormal amount of internal stress locked into the structure by the processes used in construction, together with an acute concentration of stresses caused by defective welding at the starboard gunwale in way of the abrupt ending of the bridge fashion plate, augmented by the hogging stress due to the unfavorable ballasted condition. This concentration of stress caused a tensile failure at the starboard sheer strake which was formed of steel of sub-standard quality, all of which was aggravated to some degree by the drop in atmospheric temperature."

First testimony before the Senate Investigating Committee will be found on Pages 130-131.

The report summarizes the conditions prevailing at the time, most of which were reviewed in the March 18 issue of THE IRON AGE, page 89. Some credence was given to the alleged report that several people felt a seismic disturbance (earth tremor) at the time of the failure, but the committee dismissed this disturbance as having little bearing on the crack-up.

The vessel broke in two with a loud report, fracturing suddenly across the deck at a point just abaft the after end of the bridge about amidships, the fracture extending down both sides to the bottom shell plating, which remained intact. All deck, side and bottom longitudinal frames fractured as did also the plating of the corrugated longitudinal bulkheads and the centerline deck and bottom girders. In no case did the fractures occur in the transverse welds. The vessel jackknifed so that the bottom shell plating knuckled transversely and showed above the water while the ends of the forward and after sections settled in the silt. There was a gap of 10 ft. at the deck.

The committee summarized its findings as follows:

(a) "There was a tendency on the part of the shipyard personnel to depart from recognized fundamentals of good welded construction for the laudable purpose of speeding up construction to the utmost possible extent to meet the needs of the present emergency.

(b) "There were insufficient numbers of trained experienced welders and ship fitters available for the job at the rate of production maintained and an inadequate number of skilled welding supervisors with the necessary knowledge of the basic elements of good welding practice to exercise proper control over the welders.

(c) "There was neglect on the part of the personnel to realize the importance of adhering rigidly to established welding procedures and welding sequences necessary to reduce shrinkage stresses to a safe minimum.

(d) "There was evidence in the sister vessels under construction of poor fitting of large subassemblies which necessitated considerable forcing into position by the excessive use of jacks, turnbuckles, etc. In other cases open joints required the use of an excessive amount of welding to finish the joint, resulting in excessive shrinkage.

(e) "There was a lack of uniformity in the quality of the steel used in the hull structure. For example, as compared with other plates investigated, the particular sheer strake plate on the starboard side where the facture apparently started had a very low proportional limit (10,000 lb. per sq. in.) as determined by extensometer readings; also the Charpy test impact values for this plate were low, even at room temperatures; and brittle at 20 deg. F. The values from the notch bend tests also showed considerable brittleness. It should be recognized that the Charpy and notch bend tests are not included in the ordinary commercial tests by which the quality of structural steel is determined.

(f) "A serious accumulation of shrinkage stresses occurred in the automatic machine welding of the deck assembly joints especially in the longitudinal joint at the gunwale attaching the sheer strake to the stringer plate. This particular welded joint was also found defective in way of the location where the failure started as evidenced not only by a longitudinal crack but also by what appeared to be minute transverse cracks in the weld.

(g) "The hogging moment resulting from the distribution of ballast, fuel, etc., in the end tanks (the fore peak, the forward deep tanks and the afterpeak tanks were full of water) produced a tensile stress on the upper flange of the hull girder of approximately 4½ tons per sq. in., which is comparatively moderate and certainly not sufficient in itself to cause any failure in the hull structure.

(h) "While there is no question with regard to the sufficiency of the vessel's structure, there being no departure from recognized and proven design standards, the abrupt termination of the bridge-end fashion plates at the top of the sheer strake did constitute a serious point of stress concentration, especially in a welded structure."

The sub-committee was made up of the following members: A. G. Bissell, senior welding engineer, Bureau of Ships, Navy Department, Washington; Erland D. Debes, welding engineer, Bethlehem Steel Co., Shipbuilding Division, Quincy, Mass.; La Motte Grover, structural welding engineer, Air Reduction Sales Co., New York; A. A. Norton, hull superintendent, Sun Shipbuilding & Dry Dock Co., Chester, Pa.; Harry W. Pierce, welding engineer, New York Shipbuilding Corp., Camden, N. J.

Prof. S. H. Graf, professor of mechanical engineering, Oregon State College, acted as a consultant to the committee on the steel investigation phase. The following officials of the American Bureau of Shipping, New York, acted as ex-officio members of the committee: J. Lewis Luckenbach, president; D. Arnott, vice-president and chief surveyor; J. L. Wilson, assistant chief surveyor.

Commenting on the report of this committee, Edgar J. Kaiser, vice-president and general manager of Kaiser Portland area shipyards, said the American Bureau of Shipping put too much emphasis on welding and shipfitting as causes of the tanker Schenectady's breaking apart.

Mr. Kaiser, who is the son of Henry J. Kaiser, continued that he believed the Bureau's sub-committee "will unanimously concur with the statement that the workmen at the Swan Island Yard can be proud of their work on the Schenectady and her sister ships. They are good, sound ships, of good workmanship and quality, and the failure was due to a combination of factors, as the committee so stated, all of which occurred simultaneously."

J. Lester Perry, president of Carnegie-Illinois Steel Corp., in a statement issued March 19, said that his company welcomed any inquiries regarding the quality of steel plate produced at its Irvin Works.

"The Irvin Works, originally built and operated as a sheet mill, was converted to a plate mill in 1942 in order to help meet the Government's increased demand for plate," Mr. Perry said. "After a rapid conversion, this plant has turned out an unprecedented tonnage of plates for war use and particularly for the shipbuiding program.

•

Inquiry into Sinking Looms at Washington

Washington

• • • **With the Senate Committee** investigating the National Defense taking up an inquiry initially centering about the crack-up of the Kaiser-built tanker Schenectady, a seven-man House subcommittee on the Committee on Merchant Marine and Fisheries is preparing to launch a sweeping investigation regarding ship designing and construction. Primarily, it is said, the House inquiry was inspired by recurrent reports of faulty workmanship, particularly with respect to welding.

Cutting Tool Deliveries Months Behind Schedule, Careful Use Urged

Washington

• • • **Pointing out** that cutting tools are now being used by approximately 10,000,000 war workers, many of whom never handled such tools before, George H. Johnson, WPB Tools Division director, said March 20 that the present high loss from their misuse can be reduced through shop education. Indicating the importance of such training, he said that deliveries of these tools are approximately four months behind schedule. With demand so greatly outstripping supply, every tool broken or dulled through careless handling means less war production. Workers, he declared, can make a direct contribution to winning the war—over and above their regular tasks—by learning to take care of their tools.

"Production will have to be raised about $500,000,000 in 1943 to provide the cutting tools required for war production," Mr. Johnson said. "High speed steel and other critical materials, including tungsten and cobalt, are used in manufacturing cutting tools and these materials, so urgently needed for the war effort, are wasted when tools are put out of commission through carelessness and misuse. Money the government might better spend in many other ways is also wasted, of course. For these reasons, as well as because the tools themselves are scarce, new workers should be trained as speedily as possible in good shop practices."

Rules followed by experienced workmen, Mr. Johnson said, include changing tool bits before they get too dull; using guides to locate jig holes; keeping special collars clean and parallel, and above all, putting tools away carefully.

"We must get across to the workers the fundamental idea that tools are war weapons and that they must be as well cared for as guns," he added. "If the novices learn to handle their tools with care and skill they will get approximately 10 per cent more use out of them and war production will be stepped up accordingly."

He said cutting tools are perishable even under normal conditions and their lives have been shortened by the high speeds and heavy feeds of war production. Production of cutting tools for 1942 amounted to $400,000,000 with December shipments reaching a high of $35,327,000. The December backlog, Mr. Johnson said, was valued at $130,000,000.

WLB Refuses to Scrap 15% Wage Plan

• • • The War Labor Board in a rough and tumble meeting this week gave the CIO-AFL's petition to dissolve the "Little Steel" wage formula a staunch refusal by a vote of 8 to 4 in favor of its maintenance. The eight members representing industry and the public were the "ayes" with the labor members voting the "nays." The labor members agreed to abide by what they termed the democratic majority. There is some talk still that the President may ask the WLB to increase the 15 per cent formula by 5 per cent as an appeasement policy although this is unconfirmed and certainly not yet on the records.

4 TONS AIRPLANE CARBURETORS

This tremendous quantity of cast aluminum carburetors is cleaned, after machining and before anodizing, with a Wyandotte solvent detergent. This is the daily cleaning job of one manufacturer.

Equipment—Two-compartment Power Washer.

First operation—(1st compartment: One gallon of the Wyandotte solvent detergent in 800 gallons of water. Temperature 160° F.)
(2nd compartment: Clear hot water rinse, 160° F.)

Second operation—Air blow-off.

Third operation—Anodizing.

Wyandotte Metal Cleaning and Degreasing Products—together with the experienced service given by Wyandotte Field Engineers—are proving of value to manufacturers of bomb bodies, cartridge cases, projectiles, bomb fins, fuses, pistons, crankshafts. . . . There is a Wyandotte Cleaner for every metal cleaning job, and for use in all types of equipment.

Your Wyandotte Representative is ready to help you, now.

WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION • WYANDOTTE, MICHIGAN

Wyandotte

• SERVICE REPRESENTATIVES IN 88 CITIES

• Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

• • • Senate Committee, C-I Employees, President

Washington

• • • **Hearings before the** Truman Senate Committee on Tuesday regarding alleged defective plates produced for the government by the Carnegie-Illinois Steel Corp. at its Irvin works developed charges by minor employees at the plant that substandard plates had been permitted to pass inspection and met with a reply by President J. Lester Perry of the company that a thorough investigation is under way. He declared that changes in personnel will be made in order to insure full compliance with prescribed testing procedures. President Perry declared that higher management of the company is in no way involved in these developments which were set forth in written and oral statements by workers. He said that these deviations from such procedures were never permitted or condoned by them. He attributed passing of defective plates to the laxity of inspectors.

Senators of the committee were sharply critical in their questions. Senator Homer Ferguson, Republican of Michigan, and Senator Ralph Brewster, Republican of Maine, said that the company had "cheated" its customers by faking analyses of steel, constituting material misrepresentations so that the steel company profited thereby. Senator Brewster took issue with Mr. Perry at that part of his statement where the steel executive said that the report of the American Bureau of Shipping, which related to the sinking of the Kaiser tanker Schenectady, in the opinion of the corporation, was not due to the failure of steel. The Senator quoted from the Bureau's minority report by Prof. S. H. Graf. The Senator said that the Professor's report stated that "the breaking up of the Schenectady was due to a combination of unfavorable temperature, internal stresses and the very poor quality of the steel —the last named is believed to be the most serious and most responsible."

For details of findings on the cause of sinking of the Schenectady see page 128.

o o o

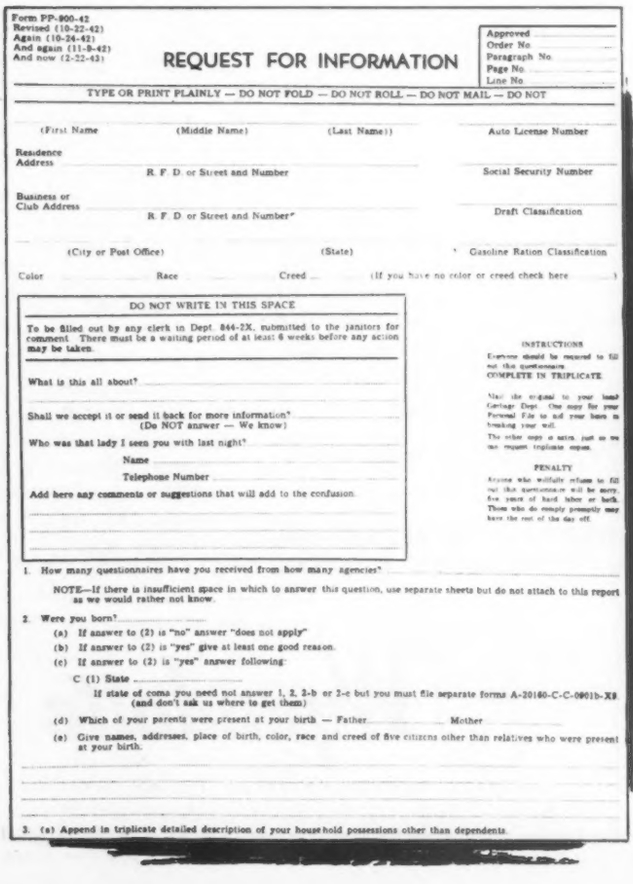
A quiz-dizzy industrialist has tried his hand at doing some dizzy quizzing of his own, bringing forth the masterpiece shown here in part.

Mr. Perry denied the steel was to blame, in his opinion, and justified his statement as to the concurrence of the American Bureau of Shipping majority report that it was "in our opinion not due to the failure of steel."

In any event the plate at the point where the break began was not a product of the Irvin works, Mr. Perry said.

Dr. R. E. Zimmerman, vice-president of the United States Steel Corp., testified that physical tests of steel taken from the Schenectady which broke up on Jan. 16 are in process but that actual tests of plates at fault had not been made. On the other hand, it was stated that a private laboratory had tested plates of the same heat as those of which the Schenectady was constructed and that they had found them to have a tensile strength of 66,000 lb.

The American Bureau of Shipping specification is 58,000 lb. tensile strength. Senator Brewster tried to cast reflection on the test of plates which came from Homestead, asserting that the company could not know what heat was being tested if Home-



Form PP-900-42
Revised (10-22-42)
Again (10-24-42)
And again (11-8-42)
And now (2-22-43)

REQUEST FOR INFORMATION

Approved .....
Order No. .....
Paragraph No. .....
Page No. .....
Line No. .....

TYPE OR PRINT PLAINLY — DO NOT FOLD — DO NOT ROLL — DO NOT MAIL — DO NOT

(First Name) (Middle Name) (Last Name)) Auto License Number

Residence Address ..... R. F. D. or Street and Number Social Security Number

Business or Club Address ..... R. F. D. or Street and Number Draft Classification

(City or Post Office) (State) Gasoline Ration Classification

Color ..... Race ..... Creed ..... (If you have no color or creed check here .....)

DO NOT WRITE IN THIS SPACE

To be filled out by any clerk in Dept. 844-2X, submitted to the janitors for comment. There must be a waiting period of at least 6 weeks before any action may be taken.

What is this all about? .....

Shall we accept it or send it back for more information? .....
(Do NOT answer — We know)

Who was that lady I seen you with last night? .....

Name .....

Telephone Number .....

Add here any comments or suggestions that will add to the confusion.

INSTRUCTIONS
Everyone should be excused to fill out this questionnaire.
COMPLETE IN TRIPLICATE

Mail the original to your local Garbage Dept. One copy for your Personal File to aid your heirs in breaking your will.

The other copy or extra, just in we may request triplicate copies.

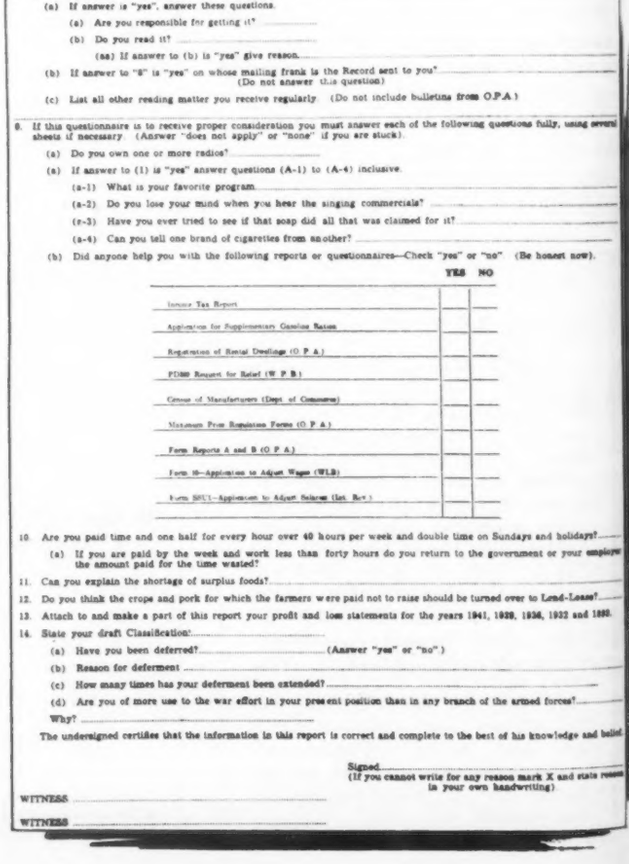
PENALTY
Anyone who willfully refuses to fill out this questionnaire will be sorry. Six years of hard labor or both. Those who do comply promptly may have the rest of the day off.

1. How many questionnaires have you received from how many agencies? .....

NOTE—If there is insufficient space in which to answer this question, use separate sheets but do not attach to this report as we would rather not know.

2. Were you born? .....
(a) If answer to (2) is "no" answer "does not apply"
(b) If answer to (2) is "yes" give at least one good reason.
(c) If answer to (2) is "yes" answer following:
C (1) State .....
If state of coma you need not answer 1, 2, 2-b or 2-c but you must file separate forms A-20160-C-C-0901b-X9 (and don't ask us where to get them)
(d) Which of your parents were present at your birth — Father ..... Mother .....
(e) Give names, addresses, place of birth, color, race and creed of five citizens other than relatives who were present at your birth.

3. (a) Append in triplicate detailed description of your household possessions other than dependents.



8. Do you receive copies of the Congressional Record? .....
(a) If answer is "yes", answer these questions.
(a) Are you responsible for getting it? .....
(b) Do you read it? .....
(aa) If answer to (b) is "yes" give reason. .....
(b) If answer to "8" is "yes" on whose mailing frank is the Record sent to you? .....
(Do not answer this question)
(c) List all other reading matter you receive regularly. (Do not include bulletins from O.P.A.)

9. If this questionnaire is to receive proper consideration you must answer each of the following questions fully, using several sheets if necessary. (Answer "does not apply" or "none" if you are stuck).
(a) Do you own one or more radios? .....
(a) If answer to (1) is "yes" answer questions (A-1) to (A-4) inclusive.
(a-1) What is your favorite program. .....
(a-2) Do you lose your mind when you hear the singing commercials? .....
(a-3) Have you ever tried to see if that soap did all that was claimed for it? .....
(a-4) Can you tell one brand of cigarettes from another? .....
(b) Did anyone help you with the following reports or questionnaires—Check "yes" or "no" (Be honest now).

	YES	NO
Income Tax Report		
Application for Supplementary Gasoline Ration		
Registration of Rental Dwellings (O. P. A.)		
PD380 Request for Relief (W. P. B.)		
Census of Manufacturers (Dept. of Commerce)		
Maximum Price Regulation Forms (O. P. A.)		
Form Reports A and B (O. P. A.)		
Form 10—Application to Adjust Wages (WLB)		
Form 588U—Application to Adjust Salaries (Int. Rev.)		

10. Are you paid time and one half for every hour over 40 hours per week and double time on Sundays and holidays? .....
(a) If you are paid by the week and work less than forty hours do you return to the government or your employer the amount paid for the time wasted?
11. Can you explain the shortage of surplus foods? .....
12. Do you think the crops and pork for which the farmers were paid not to raise should be turned over to Lend-Lease? .....
13. Attach to and make a part of this report your profit and loss statements for the years 1941, 1939, 1936, 1932 and 1929.
14. State your draft Classification: .....
(a) Have you been deferred? .....(Answer "yes" or "no")
(b) Reason for deferment .....
(c) How many times has your deferment been extended? .....
(d) Are you of more use to the war effort in your present position than in any branch of the armed forces? .....
Why? .....

The undersigned certifies that the information in this report is correct and complete to the best of his knowledge and belief.

Signed .....
(If you cannot write for any reason mark X and state reason in your own handwriting)

WITNESS .....

WITNESS .....

Perry Mix It on Defective Plate Charges . . .

C-I President Perry's Statement on Plate Charges

Statement of J. Lester Perry, president, Carnegie-Illinois Steel Corp., before the Senate committee investigating the war effort.

CARNEGIE-ILLINOIS STEEL CORP. at all times has devoted its best efforts to the production of high quality steel for the nation's war effort. Its management deeply deplores what has been disclosed at today's hearing. These disclosures concern non-compliance with this company's established procedures for the testing of plates produced at Irvin works. The higher management of this company is in no way involved in these deviations from such procedures, which were unknown to such officials and never permitted or condoned by them. A thorough investigation is under way, and changes in personnel will be made, wherever required, in order to insure full compliance in the future with these prescribed testing procedures.

Regrettable as these occurrences have been it is reassuring to know that the plates furnished by Irvin works have been entirely suitable for their intended uses, as is shown by complete customer acceptance of the product.

The only explanation which can be given for the failure to carry out prescribed testing procedures is that a few individuals responsible for the making of the tests, having an intimate knowledge of the high character of the steel and honestly believing that the plates in question would fully meet all requirements, grew lax under the pressure of heavy production in the proper performance of their specified duties.

The public and the employees of this company can be confident that steel of high quality—for the production of which this company has an enviable reputation built up by many years of fine service to its customers—will continue as in the past to be produced by Carnegie-Illinois Steel Corp., unaffected by this temporary departure from prescribed testing procedures in a single department of one plant out of the many plants operated by this company.

This one plant was converted in 1942 from a sheet mill to a plate mill to help meet the heavy demand for plates. Shipyards using Irvin works' plates have stated to us that these plates are entirely satisfactory for shipbuilding.

In our opinion, which is supported by the report of the American Bureau of Shipping, the break of the tanker Schenectady was not due to the failure of steel. In any event the plate at the point where the break began was not a product of the Irvin works.

stead heat-marking practices were the same as those at the Irvin works. Dr. Zimmerman stated that it was his belief that the correct heat was tested. Senator Brewster referred to the metallurgical report of Prof. Graf and the statement in it that the steel plates were definitely sub-standard. Both Mr. Perry and Dr. Zimmerman denied that the steel was sub-standard, and Dr. Zimmerman stated that the margin of strength would be at least three times what is required.

Prof. Graf made two tests, one at 60 deg. F. and one at 20 deg. F. and Dr. Zimmerman said that the results of both tests show the steel was of such a quality as to meet the specifications. Prof. Graf's tests were made at the laboratory of the Oregon State College with which he is connected. At 60 deg. the plates tested 55,300 lb. At 20 deg. the temperature of the water on the day the Schenectady broke, the steel tested 58,600 lb. well above the American Bureau of Shipping specification.

Senator Truman of Missouri, chairman of the committee, presented a statement accusing the corporation of lack of cooperation with its investigators. He said that corporation attorneys insisted upon being present when plant employees were questioned and that certain records were not granted willingly to investigators for their inspection. To this charge Mr. Perry replied that if there had been any lack of cooperation it had been inadvertent and through lack of knowledge of investigative procedures. He declared that the reason books were not given to the investigators, in particular records of the analyses of various heats, was because they were needed in the operation of the plant. Senator Truman and U. B. Fulton, counsel for the committee, said that the heat analyses books "had been taken apart" over night but that he could not say for what purpose. The inference by the Senator and Mr. Fulton was that they were not dismembered for "operational purposes" as Mr. Perry testified.

Testimony as to analyses "faking" was given by W. F. McGarrity, chief metallurgist and inspector; J. K. McConnell, sheet mill metallurgist inspector; N. Ireland, assistant sheet mill metallurgist inspector; Irene T. Pasternak, clerk in charge of the heat analyses book, and R. E. Stewart, chief specifications examiner. The testimony was to the effect that out of the 720,000 tons of plates produced, 36,000 tons or 5 per cent fell into the fake category. The practices which were not sanctioned by the chief metallurgist and inspector nor by higher company officials had to do with renumbering heats whose identity had been lost because of clerical errors in the slab yard, the adjustment of chemistries to agree with new numbers assigned to "fool" inspectors, the relaxation of tensile strength elongation and lamination standards.

Mr. McConnell and Mr. Ireland declared that a tolerance of 3000 lb. had been arrived at by mutual agreement so that plates which were required to test up to 60,000 lb. were passed if they tested 58,000 lb. In the elongation test, Mr. McConnell said, a 3 per cent "pull-in" was permitted where samples were supposed to test 23 per cent and some were permitted to pass, he claimed, if they tested 20 per cent.

Mr. Perry answered charges that plates had been passed by inspectors which varied in the carbon content. Plates which called for 21 carbon sometimes only contained 18. He said that such deviation was unpreventable and was to be found in any average tonnage of steel and was generally accepted by customers.

Senator Brewster attacked the steel executive's insistence that the alleged faking practices were unknown to the higher officials of Carnegie-Illinois. Mr. Perry said that it would be impossible for any one to know what each of the more than 20,000 workers did in his daily work.

PERSONALS

• **J. Russell Duncan,** secretary of Peerless Machine Co., Racine, Wis., has been appointed general manager of the company.

• **W. A. Steele** has been appointed general superintendent of the Wickwire Spencer Steel Co.'s Buffalo Works. Mr. Steele succeeds Fred Johnson who is retiring from active duty after more than 20 years with Wickwire at its Buffalo plant. **Bennett Lodge** has been named assistant general superintendent.

• **T. W. Plante,** who has been assistant superintendent of the Eliza furnaces at Pittsburgh Works of the Jones & Laughlin Steel Corp. since 1938, has been appointed superintendent of blast furnaces, coke works and ore docks at Otis Works, Cleveland. **Thomas Brown, Sr.,** who has been assistant superintendent of blast furnaces at Jones & Laughlin's Otis Works, Cleveland, since 1938, has been appointed superintendent of blast furnaces. **L. C. Steele** who has been assistant master mechanic at Eliza furnaces, will succeed Mr. Plante as assistant superintendent and **D. W. Smith,** of the combustion department, will replace Mr. Steele as assistant master mechanic.

• **William L. Batt,** vice-chairman of WPB, has been given the annual medal and $10,000 Philadelphia award as the citizen who performed the most distinguished service for the city in 1942. The award was established in 1921 by the late Edward W. Bok. Mr. Batt is president of the SKF Industries, Philadelphia.

• **Albert L. Cuff, William Frew,** and **Charles M. Thorp, Jr.,** have been elected directors of the Blaw-Knox Co. to fill vacancies on the board. Mr. Cuff has been affiliated with the company since 1928 and has been secretary and general counsel since 1937. Mr. Frew is chairman of the executive committee of trustees of the Carnegie Institute of Technology and vice-president and trustee of the Carnegie Institute. Mr. Thorp, a member of the law firm of Thorp, Bostwick, Reed & Armstrong, is a director of the Edgewater Steel Co. and Pennsylvania Industries, Inc.

• **Orville T. Barnett,** engineer of tests for Murex arc-welding electrodes, of Metal & Thermit Corp., New York,

J. R. DUNCAN, general manager, Peerless Machine Co., Racine, Wis.

has been made production engineer for both arc-welding and Thermit welding divisions. Before joining Metal & Thermit Corp., in 1940, he was connected with Black, Seville & Bryson of Oklahoma City, where he was in charge of welding and shop inspection. **E. A. Leaverty,** purchasing agent of Metal & Thermit Corp., has been made general purchasing agent for the entire organization, including the plants at Jersey City, Carteret and Piscataway, N. J., East Chicago and South San Francisco.

• **Harry R. Meyer** has been named general manager of sales at By-Products Steel Corp., Coatesville, Pa. Mr. Meyer was formerly manager of direct sales for Lukens Steel Co., of which By-Products Steel is a subsidiary.

W. A. STEELE, general superintendent, Buffalo Works, Wickwire Spencer Steel Co.

• **William D. Reed** has been elected vice-president of the Sawhill Mfg. Co., Wheatland, Pa. During the past year he has been general sales manager of the company and prior to that time was affiliated with the Republic Steel Corp., Pipe Sales Division, in Youngstown, Cleveland and Chicago.

• **Herbert W. McKeague,** formerly assistant purchasing agent in the Westinghouse Electric & Mfg. Co.'s radio division at Baltimore, has been appointed purchasing agent in the transformer division of the company's Sharon Works.

• **Arthur W. F. Green** has been appointed materials engineer administrator of the heat treating and plating divisions of N. A. Woodworth Co., Ferndale, Mich. Mr. Green formerly was materials engineer for the Pratt & Whitney Aircraft Division of the United Aircraft Corp., East Hartford, Conn. He has been associated with the steel and metals industries since June, 1916. The new Woodworth executive consecutively served John Illingworth Steel Co., Poldi Steel Corp., Edgecomb Steel Co., American Chain & Cable Co. and in 1934 as director of the physical laboratories of the Ludlum Steel Co. in Watervliet, N. Y. He joined Pratt & Whitney in 1937.

• **C. B. Smith** has recently been appointed director of the tools and equipment section of the Ordnance Department, Tank-Automotive Center in Detroit.

• **L. H. Corlette,** district sales manager for A.C.F. Motors and the J. G. Brill Co., New York, has been transferred "for the duration" to headquarters at Philadelphia. He will serve as coordinator of the War Production Engineering Division of the company, which handles the development of new war items in their initial stages of production. **R. H. Sjoberg,** formerly at New York, and who transferred to Philadelphia in March of last year, has recently been made assistant to president. **W. M. Horsell,** district sales manager for Brill and A.C.F. Motors, covering Philadelphia, Baltimore and Washington, has, in addition to his regular duties, assumed direction of the company's "Priorities and CMP Section," at Philadelphia. **A. J. Erlacher,** district sales manager for Brill and A.C.F. Motors (covering Pennsyl-

vania, Maryland and Southeastern United States) is, in addition to his regular duties, serving as liaison engineer in charge of the company's Naval Ship Work, and **L. E. Vogt**, of the Intercity Coach Division of the company, has been appointed special representative at Philadelphia to follow the company's Naval aircraft work.

• **Andrew H. Phelps**, vice-president in charge of purchases and traffic for the Westinghouse Electric & Mfg. Co., has recently received the Westinghouse Order of Merit for exceptional service to the electrical industry and his company in wartime. The award, voted by the company's board of directors, was established in 1935 to give recognition to employees who make outstanding contributions to the electrical industry.

• **Kenneth Johnson**, assistant works manager of the AC Spark Plug Division, Flint, has been appointed superintendent of Plant A. He succeeds **Archie Skelton** who has been promoted to coordinate spark plug manufacture between AC plants in Flint and Ionia, Mich.

• **John F. Byrne** has been elected a vice-president of Koppers United Co. Mr. Byrne is general manager of Koppers United Co.'s blast furnace division, Granite City, Ill., and will continue in that position.

• **John W. Dixon** has been appointed controller of Cleveland Graphite Bronze Co., Cleveland.

• **Marvin J. Alef** has been named manager of the bullet core division of Willys-Overland Motors, Inc., Toledo. He was formerly executive vice-president of Detrola Radio Corp.

• **C. E. Robinson**, former district sales manager, and recently assistant manager of sales, has been elected general manager of sales of the Mid-West Forging & Mfg. Co.

• **R. S. Neblett**, who was assistant manager of General Electric's Turbine division for more than three years, has been appointed assistant manager of the company's Federal & Marine division. Mr. Neblett entered the company's test course in 1923, joined the G-E Turbine division in March, 1926, became manager of sales of the Schenectady section in that division in 1938. In 1939 he was named assistant manager of the Turbine division.

OBITUARY...

• **John G. Barry**, honorary vice-president of the General Electric Co. died at his home in Schenectady, March 4, after a long illness. He was 75 years old. Mr. Barry had retired as senior vice-president of the company July 1, 1935, after more than 45 years' service, and was elected an honorary vice-president. His entry into the electrical industry was as an apprentice and test man with the Thomson-Houston Co., a predecessor of General Electric, in 1885, at Lynn, Mass. In 1892, when the General Electric Co. was formed, he became a member of the railway department, which at that time was one of the company's two main divisions. From Boston he went to New York, and then to Schenectady, where in 1897, three years after his arrival, he was made assistant manager of the railway department. His notable success in developing the railway department, of which he was manager since 1907, resulted in his appointment as general sales manager in 1917, while still retaining managership of the railway department. Finally, in June, 1922, he received the further distinction of being advanced to a vice-presidency. In July, 1928, Mr. Lovejoy was appointed an honorary vice-president and retired from active duty, leaving Mr. Barry sole executive head of apparatus sales efforts.

• **Fred T. Macrae, Jr.**, executive vice-president of White Motor Co., Cleveland, died March 3. He had been executive vice-president of the company since 1940 and prior to joining the company as vice-president in 1935 he had served with the Autocar Co., as vice-president of Federal Truck Co. from 1914 to 1917, as president of the Rice-Macrea Motor Truck Co., from 1917 to 1927 and president of the Day-Elder Truck Co. from 1927 until 1935.

• **Charles A. Davis**, assistant general superintendent of Youngstown Sheet & Tube Co.'s Youngstown district plants for 14 years, died March 3, aged 55 years.

• **Walter T. Mahla**, general superintendent of the Christy Park works of the National Tube Co., Pittsburgh, for the past two and a half years died recently of an heart attack while attending a company dinner at the University Club, Pittsburgh. He was 52 years old. He went to the McKeesport works from Lorain, Ohio, where he was superintendent of the pipe mills of the National Tube Co.

• **Martin Schiff**, chief engineer of the Century Electric Co., St. Louis, died suddenly on Feb. 15. Before joining the Century organization in 1933 he had previously been employed as a test engineer at Diehl Mfg. Co., Elizabeth, N. J., from 1912 to 1913; assistant engineer of the Ideal Electric & Mfg. Co., Mansfield, Ohio, from 1913 to 1916; was in charge of a.c. design at the Electro Dynamic Co., Bayonne, N. J., during 1920; chief engineer of Roth Brothers & Co., from 1920 to 1929, and as assistant chief engineer and assistant to the president of the Imperial Electric Co., Akron, Ohio, from 1929 to 1933.

• **C. G. Gilbert**, manager of the Detroit office of the Federal Products Corp., died on Jan. 28 at Detroit. He was 60 years old, and had been connected with the Federal Products Corp. for 22 years.

• **Arthur A. Mayer**, one of the founders of the Milwaukee Electric Crane Mfg. Co., Milwaukee, which later merged with the Harnischfeger Corp., died Feb. 20, aged 66 years. He was a mechanical engineer in the crane and hoist department at Harnischfeger at the time of his death.

• **Joseph A. Harnischfeger**, director of the Harnischfeger Corp., Milwaukee, and nephew of Henry Harnischfeger, founder of the company, died Feb. 26 at the home of a sister-in-law in Milwaukee at the age of 64 years. He went to work for the old Pawling & Harnischfeger Co. at the age of 17 years, later becoming an erecting engineer, head of the testing department and superintendent of electrical production. He has been a director since 1912.

• **William J. Kibler**, president of the Buffalo Steel Co., Tonawanda, N. Y., died Feb. 25, aged 70 years. He had been associated with the firm for 43 years.

• **Oswald H. Johel**, tool designer, inventor and supervisor with the Buffalo Bolt Co. for more than half a century, died Feb. 22, aged 79 years.

• **H. C. Cappel**, treasurer, Greer Steel Co., Dover, Ohio, died recently. Mr. Cappel has been with the Greer Steel Co. for the past 26 years. He was 58 years old.

• **Elmer H. Schwarz**, consulting engineer and patent expert, died suddenly in Englewood, N. J., Feb. 21. He was a partner in the engineering firm of Schwarz, Hughes & McCarthy, New York.

MACHINE TOOLS

. . . Sales, Inquiries and Market News

Output Still Maintained At High Production Level

Cleveland

• • • **While deliveries of machine tools** at the present time are being made at high rates, with production being proportionately high, there is a general misconception that the machine tool industry has about reached the end of its war business. This statement is slightly misleading since at the present time, backlogs of the industry, running between five and seven months, are considerably greater than the normal backlogs of the industry and, while orders have fallen off when compared with the volume received during the early months of 1942, they are still fairly high.

The one factor that puts the industry more or less on the spot is that its productive capacity has been extended to such a point that it takes considerably more business than was necessary in normal times to keep the industry working at a high rate of operations. It is for this reason alone that many of the large producers have been seeking outside work, such as manufacturing parts on a subcontract. The availability of production tools in the machine tool builder's plants permits taking up temporary slacks in operation of this equipment by taking on some outside production jobs.

There definitely is no slowing down of operations in the industry at the present time, and there has been no laying off of help because the industry is approaching the end of its war business. On the contrary, the scarcity of help still continues to be one of the industry's problems.

Furthermore, as many of the machine tool builders also produce lines of small tools, such as chucks, tool holders, cutters, etc., that are used on their equipment, this further tends to keep the industry busy. As many of these items are more or less expendable, there is a constant recurrence of new business in this line. The supply situation with regard to these items is now extremely tight, with what are normally standard "off the shelf" items now not available for 30 days and often not within six months.

At the present time, the industry as a whole is finally being pressed into using substitute materials for standard items in the construction of machine tools. For example, stocks of higher alloy steels and steel parts are about gone and builders must make many of these parts of lower alloy steels, such as those steels in the NE series. Other industries have already met this obstacle and have overcome it, but cushions of stocks in the machine tool industry carried builders through until just recently, when a wholesale switchover became necessary.

While this changeover is presenting some minor difficulties from a manufacturing standpoint and from the standpoint of deciding what steel should be used as the substitute, on the whole the acceptance of NE steels has been universal. Sufficient time has not yet elapsed to determine whether parts made of these new steels will stand up as well as those made from the higher alloy grades, but trouble from this source is not expected to be of much account.

Builders have also gone over their products carefully to see what parts that in the past were made of critical materials can now be made of less scarce materials. Steel tubing has been substituted for copper tubing in oil lines; plastic dials have replaced aluminum and steel dials; bronze has given way to cast iron in bushings; steel has been substituted in many places for aluminum; and similar replacements have been made wherever possible of less scarce materials for the more critical metals.

•

Two New Chapters of Tool Engineers Chartered

• • • **Announcement has been made** by Otto W. Winter, president of the American Society of Tool Engineers of the chartering of two more chapters—the 56th and 57th—located respectively in Fort Wayne, Ind., and Kansas City, Mo.

The Fort Wayne chapter, with 59 charter members is headed by Cyril Grindrod, assistant to vice-president in charge of production, S. F. Bowser Co., Inc., as chairman and Paul Weitzman, supervisor of planning of the General Electric Co. as vice-chairman. Other officers are: Milton Kline, machinery and tool purchaser, General Electric, secretary; and G. Doyal White, supervisor of tools and supplies, General Electric, treasurer.

W. W. Mason, engineering department of Black-Sivalls & Bryson, Inc., was elected chairman of the Kansas City Chapter by its 60 charter members. Vice-chairman is A. J. Mirick, general foreman, machine shop, Black-Sivalls & Bryson, Inc., while W. H. Lebo, chief engineer of Black-Sivalls & Bryson, Inc., and L. E. Campbell, Tool engineer, Benson Mfg. Co., were respectively elected secretary and treasurer.

•

See No Slackening of High Tool Production Rate

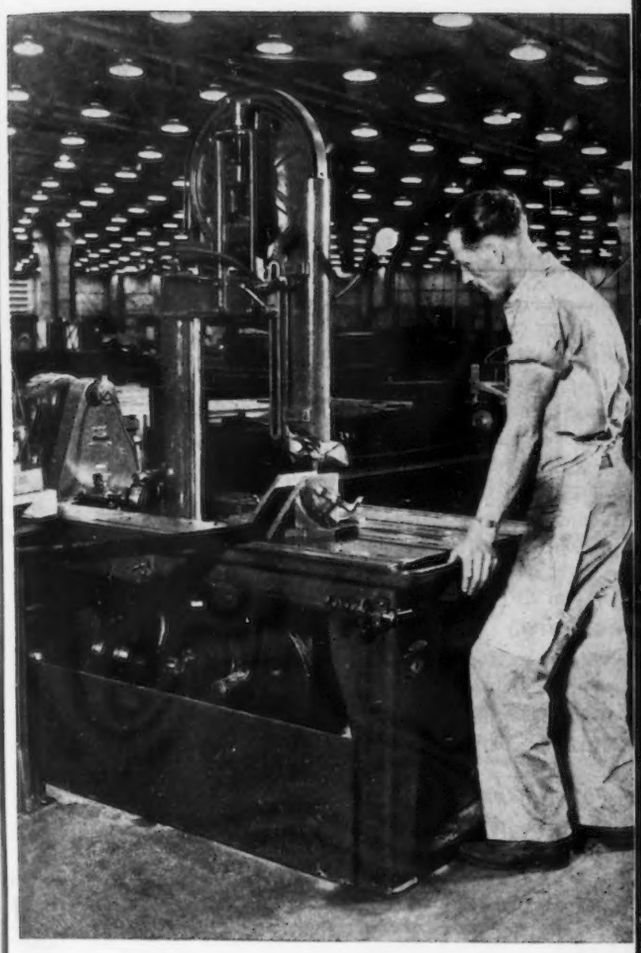
Cincinnati

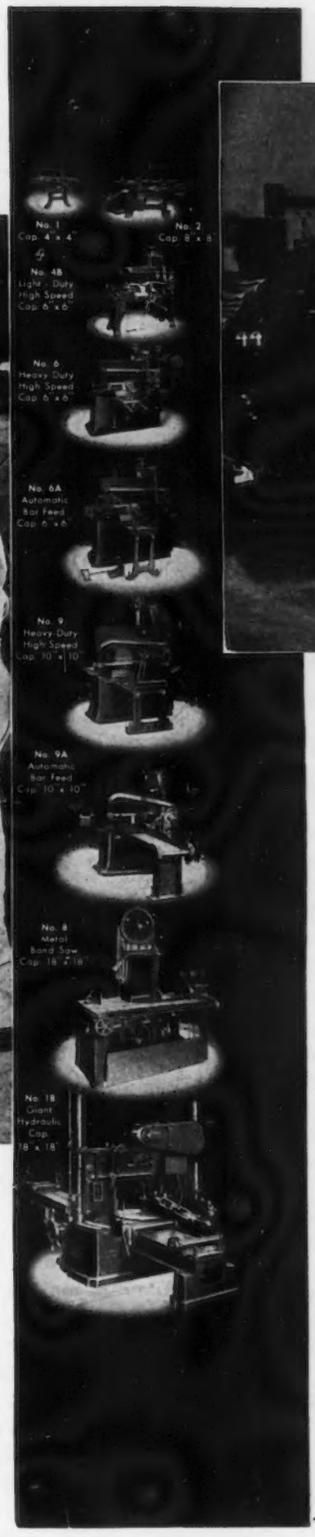
• • • **With new business continuing** to flow in at a level far above the normal rate, local machine tool builders do not anticipate any slackening in the present high production rate of machine tool industry for the remainder of this year, and in many instances, well into next year. Although there is some evidence that plants are eating into backlogs at a little faster rate than new business is coming in, there is no indication of any need for reduction in the present record-breaking level. One of the leading members of the industry in commenting upon this situation during the past week, pointed out that while in some of the standard types of war equipment many producers are now "tooled up" nevertheless the exigencies of battle bring up need for entirely new types of mechanism. Upon completion of the plans by the Ordnance Department, new machine tools must be designed, built and purchased to put into effect these new types of mechanisms. He also pointed out that in England, where they have been "tooled up" for quite some time, nevertheless the machine tool industry in Great Britain continues to go at peak levels.

The employment situation remains unchanged, although of course, a more skilled type of employee would be highly desirable.

Tractor Controls Modified

• • • **Controls on the** distribution of repair parts for track laying tractors were modified by Supplementary Order L-53-b as amended last Saturday by WPB. The order establishes control over distribution at the producer level rather than at the dealer or distributer level.





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NON-FERROUS METALS

. . . Market Activities and Price Trends

Bolivian Labor Minister Exposes Mine Saboteurs

La Paz

• • • **Two German sailors** from the *Graf Spee*, German pocket battleship scuttled in 1939 in Uruguayan waters, have sabotaged vital mining machinery in the Patino tin mines at Catavi, Bolivian Labor Minister Juan Manuel Balcazar told a press conference last week. Balcazar recently returned to La Paz after a tour of the mining areas with the combined U. S.-Bolivian Commission investigating working conditions in the tin and tungsten mines. The two Germans, he said, were among a large number who escaped from Argentine internment camps in 1940; they went to Catavi a year and a half ago and took jobs in the tin mines at the daily wage of 16 bolivianos (36c.). When the other workers noticed that they lived beyond this insignificant income, the Patino Miners Union investigated quietly, discovered the German origin of the two men and had them expelled from the country. They are now in Argentina.

President Enrigue Penaranda announced this week that the state-of-siege, imposed during the strike of 10,000 Patino miners in December and limited by the Bolivian Constitution to 90 days, has been lifted. The North American Commission, headed by Judge Calvert MacGruder, handed the Ministry of Labor its recommendations last week and is now winding up its affairs. The commission's recommendations have not been made public.

Kennecott Reports

• • • **In its annual report** to stockholders, the Kennecott Copper Corp. stated that copper production from its domestic and foreign properties had exceeded that of any other year. Its Utah property maintained its position as the largest copper producing unit in the world and had broken all previous records of output. Output from the Chino mines, a substantial part of which was marketed for the first time in fire-refined form had also reached a new high point.

Changes during the year included the production by Chase Brass & Copper Co., a wholly owned subsidiary, of substantial quantities of steel artillery cartridge cases following changes in equipment originally installed to produce brass cases. The plant is now producing large quantities of sheet brass for small arms ammunition although originally designed to make heavier sheet for larger shells.

Only Refined Metals Controlled

• • • **Price control affects** primary copper, lead and zinc only in their refined form, OPA announced March 19, in removing milling, smelting and refining of ores of the three metals from control under the General Maximum Price Regulation. Specifically the exemption covers the milling, smelting and refining of copper, lead and zinc ores, concentrates, mattes, speiss, bullion and blister.

Poorer Quality, Lower Price

• • • **Secondary slab zinc** that fails to meet the specifications for prime Western grade must be sold below the maximum price for that grade, OPA ordered March 13.

Less-than-carload lots of secondary slab zinc have been put under a new pricing formula which equalizes prices for carload and less-than-carload lots except for graduated quantity premiums.

Canadian Contract Extended

Toronto

• • • **R. H. Channing, president** of Hudson Bay Mining & Smelting Co. Ltd., announced that contracts for sale of the company's copper and zinc, at substantially pre-war prices, entered into originally in 1939 with the British Ministry of Supply, have been extended without change for another year, and a similar arrangement has been concluded with the Canadian Government. He also stated that Emergency Metals, Ltd., a wholly owned subsidiary, has been formed to mine and mill, as a war measure, the remaining portion of an ore body developed through the old Mandy shaft, approximately four miles from the company's main workings at Flinn Flon, Manitoba. As facilities of the Hudson Bay copper smelter and zinc plant are taxed to their utmost capacity by the company's own production operations, the copper and zinc concentrates to be produced by the subsidiary company, have been contracted for by Metals Reserve Co., in the United States, with the approval of Canada's Metals Controller.

During 1942, Hudson Bay Mining & Smelting Co. Ltd., established a new high record for ore mined and metals produced, and reported gross revenue of $22,482,732 compared with $20,342,831 in 1941. After providing for operating costs, depreciation, income and excess profits taxes, net profit amounted to $7,324,080 equal to $2.66 per share, which compares with net profit of $6,992,630 or $2.54 per share in the year immediately preceding.

Nickel Enters Tariff-Free

Ottawa

• • • **Finance Minister Ilsley,** in his budget address, announced certain changes in the Canadian customs tariff. Under the new ruling nickel, and alloys containing 60 per cent by weight or more of nickel, N.O.P., as ingots, blocks and shot; shapes or sections, billets, bars and rods, rolled, extruded, or drawn (not including nickel processed for use as anodes); strip, sheet, and plate (polished or not); seamless tube, now enter Canada free of duty.

Tin Salvage Sets Record

Detroit

• • • **The third tin** can salvage drive in Detroit established what was said to be a national record, with 1345 tons collected in the city and 244 more tons added in the suburbs.

The total of 1589 tons was estimated to include 13,500,000 prepared cans. Half of the collection was dispatched immediately to detinning plants and the balance was expected to go as soon as freight cars become available.

International Committee Set Up

• • • **A Combined Aluminum Committee,** representing the United States, the United Kingdom and Canada has been established to coordinate the activities of the three countries, it was announced March 21. Charles E. Wilson, executive vice-chairman of WPB, will serve as chairman of the committee. The other members are Sir Richard Fairey, director general of the British Air Commission, and George C. Bateman, metals controller

Salvage of Tin Tubes Shows Marked Decline

• • • Reporting a decline of approximately 24 per cent in national collections of used collapsible tin tubes for January, with a serious consequent reduction in the supply of tin to war industries, the regional Office of War Information in Philadelphia has appealed to both consumers and suppliers of toothpaste and shaving cream to observe strictly the tube-for-tube order issued by WPB last April 1.

Knowledge of the decline in collections, OWI stated, was obtained from a report of the Tin Salvage Institute, at Newark, only reclaiming agency of its kind in the country, which showed a national total of 310,000 lb. for January, representing a decline of 74,000 lb. The 310,000 lb. collected will yield about 100,000 lb. of tin, most of which will go to war industries.

of Canada. The Committee, which is the fourth of its kind to be appointed, will report its findings and actions to the Combined Production and Resources Board and the Combined Raw Materials Board.

A technical sub-committee consisting of Arthur H. Bunker, director of the WPB's Aluminum and Magnesium Division, and P. W. Rolleston, director of materials and supply, Supply Services, British Air Commission, has been appointed to prepare detailed estimates of 1943 and 1944 production and requirements of the three countries.

Aluminum Recovery Corp.

• • • **WPB is expected** in the very near future to announce the setting up of Aluminum Recovery Corp., at 155 East 44th Street, New York. Idle aluminum stocks were first called in by WPB in February, 1942, with the Federated Metals Corp., Detroit, acting as agent.

Gilding Metal Clad Steel Cut

• • • **Because present supplies** of small caliber bullet jackets are believed to be more than sufficient for current needs, overall production of gilding metal clad steel has been lowered to some extent. While all those making this material have not had reductions, it is believed that there have been several cuts in output which will probably hold for a while.

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Division of Associated Spring Corporation

SCRAP

. . . Market Activities and Quotation Trends

Waste Dealers Told Copper First Problem; Steel Still Serious

Chicago

• • • **While iron and steel** scrap was the No. 1 salvage problem in 1942, copper scrap is the No. 1 problem this year, Paul Cabot, director, Salvage Division, WPB, reported last week in an address before the annual convention of the National Association of Waste Material Dealers. Mr. Cabot reported that a nation wide copper salvage drive would be undertaken this year.

While copper has displaced iron and steel scrap as the No. 1 problem, Cabot stressed that the ferrous scrap picture was still not satisfactory and that a continued effort would be necessary to get out sufficient steel scrap to fill the steel mills' needs.

Charles M. Haskins, managing director of the association, reported that attendance at the meeting, which was held here at the Hotel Sherman March 16 and 17, set a new record.

David Feinburg, David Feinburg Co., Medford, Mass., was reelected president of the association. Other officers reelected were: First vice-president, N. Kurtz, M. B. Speer, Inc., Pittsburgh; second vice-president, J. H. Tyroler, Tyroler Metals, Inc., Cleveland; third vice-president, J. Muchlstein, H. Muchlstein & Co., Inc., New York, and managing director, Charles M. Haskins. Officers of the metals division chosen at the meeting were as follows: Samuel Zeldes, City Metals Refining Co., Detroit, president; H. Ladenson, Ladenson Metals Co., Philadelphia, first vice-president; and P. Moskowitz, Moskowitz Bros., Cincinnati, second vice-president.

Cabot's address also revealed that while some scrap has been returned to this country from battlegrounds abroad, this movement would be curbed since loading and unloading took from 10 days to two weeks additional time in port. The shortage of shipping makes it inadvisable to continue this practice, Cabot said.

Cabot also reported that the activities of the special projects section of the salvage division were being limited. In most WPB regions, the division will be permitted to undertake projects where the gross cost of the scrap realized does not exceed $40 a ton. In six of the WPB regions no subsidy will be permitted for any projects.

The salvage division chief asserted that no steel furnaces have been shut down for want of scrap since midsummer last year. However, he warned against "statements from the steel industry" to the effect that the scrap situation is satisfactory. Such actions, he said, served to reduce the interest in continued salvage efforts.

Carl Burton, chief of the reclamation branch, Aluminum and Magnesium Division, WPB, made a plea for intensification of efforts to segregate aluminum scrap. Burton pointed out that at present at least 85 per cent of aluminum plant scrap is now being segregated, as compared with 35 per cent when the war started. Burton made a particular plea that iron contamination of aluminum borings be eliminated.

Other speakers at the metal sessions included David Feinburg, Samuel Zeldes, E. L. Frankel, president of the Canadian Secondary Materials Association, J. A. Mirel, tin-lead division, WPB, J. D. Sumner, Fred Wolf and Kurt Rahlson, and OPA specialists.

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Institute Names Committee Heads

• • • **Abe Byer,** of American Compressed Steel Corp., Cincinnati, has been appointed chairman of the bundlers' committee of the Institute of Scrap Iron & Steel, Inc., it was announced by Edwin C. Barringer, president and executive secretary of the Institute. Leo J. Kelleher, of Southern Converting Co., Greensboro, N. C., will serve as vice-chairman.

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Goldberg Heads Scrap Group

Pittsburgh

• • • **Seventy scrap** dealers from western Pennsylvania, W. Virginia and Ohio elected S. M. Goldberg of the Pennsylvania Iron & Steel Co. as chairman of a committee to combat the labor problem in scrap yards, at a recent meeting held in Pittsburgh by the Institute of Scrap Iron and Steel, Inc. The committee is seeking NWLB approval of an increase in wage rates.

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WMI Dies April 1

• • • **As predicted in** THE IRON AGE recently, the short and stormy career of War Materials, Inc., which was slowly dismembered from the time of its creation last year, will fold up on April 1. It is expected that some other government agency will probably take care of what little work was left to do after Nelson's various directives had reduced the responsibilities of WMI.

Scrap Previewed; Steel Division May Enter Collections

• • • **Recent reports** from various governmental and other informed sources indicate that purchase scrap inventories of consumers are now at an all-time high and that collection methods are gradually improving although plenty of room for progress on the latter is also seen. At the same time these reports were taking form, the possibility of greater iron and steel scrap collection responsibilities for the scrap section of the WPB Steel Division was hinted at in some quarters. Since the big volume of scrap is expected to be produced as industrial scrap this year it is conceivable that the Steel Division's branch might take over the responsibility due to its familiarity with the necessary procedure for dealing with the mills.

Sizing up the collection possibilities of the various fields, industrial scrap is by far voted for the biggest tonnage while farms will undoubtedly produce the heaviest bulk of collected scrap. Obsolete buildings, bridges and other reclamation projects may drop to an all-time low as they have proved excessively expensive and are believed to have produced no more than one per cent of the total collections. Dormant scrap is still expected to produce fair quantities and auto graveyards although known to be much cleaner than last year may provide a worthwhile quantity. Battlefield scrap is considered out of the realm of possibility this year.

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NEW YORK—The slow tempo of recent weeks remains unchanged, with a few dealers reporting slightly larger shipments, but allocations dwindling and flow into yards still slow.

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CHICAGO—Only favorable news over the past week was the unofficial report that WPB had approved an increase in wages for yard workers. It is expected that such a move, if confirmed, will be of assistance in preventing the continued decrease in yard personnel but will not completely correct the manpower problem. Meanwhile mills continue to eat into inventories as current shipments fall below consumption. WPB officials assert that only three out of 22 Chicago district

mills have inventories in excess of 30 days supply.

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BOSTON — Salvaging of abandoned street car rails has begun in earnest, specially in central Massachusetts. Otherwise, however, scrap is coming out slowly although shops continue to pour out turnings, borings and bundle material in normal quantities. A fair tonnage of stove plate was moved the past week. Yards continue to report a serious shortage of labor.

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PHILADELPHIA—Scrap is still coming into the yards slowly, but turnings and cupola cast continue to go begging. A small amount of cupola cast has recently been sold as charging box cast, at the charging box price of $19. Some dealers fear that if the cast iron pipe makers continue removed from the market, the major part of cupola cast will have to go to the mills with a resulting $1 per ton drop in price.

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CINCINNATI—No change is reported in the flow of scrap in the market, with dealers indicating that present new material is about on the same level as the winter volume. The market generally appears to be dull with most users in fairly good condition. In fact, some melters are now reducing their stockpile under an obvious confidence that the supply of materials will continue to be sufficiently adequate to maintain their production.

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BUFFALO — Springlike weather gave Buffalo district scrapyards an opportunity to step up operations during the last week and most operators reported the situation was well in hand although the lack of manpower still hinders full scale business. Mill reserves remain in good shape with little fear of an early shortage anywhere. Some baling of turnings is being done in the larger yards.

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BIRMINGHAM—Dealers yards in Alabama, Georgia, Mississippi and Western Florida are reported here to be nearly cleaned up. There is little movement of scrap of any kind.

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PITTSBURGH — No changes reported here from conditions existing a week ago, with supply and demand continuing in balance. Nickel and tungsten turnings are still going begging here.

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ST. LOUIS—Although country collections of scrap iron are slow and may continue so as farmers are engaged in spring work, there has been an increased movement of railroad material, including scrap rails. The result is that receipts as a whole have been satisfactory.

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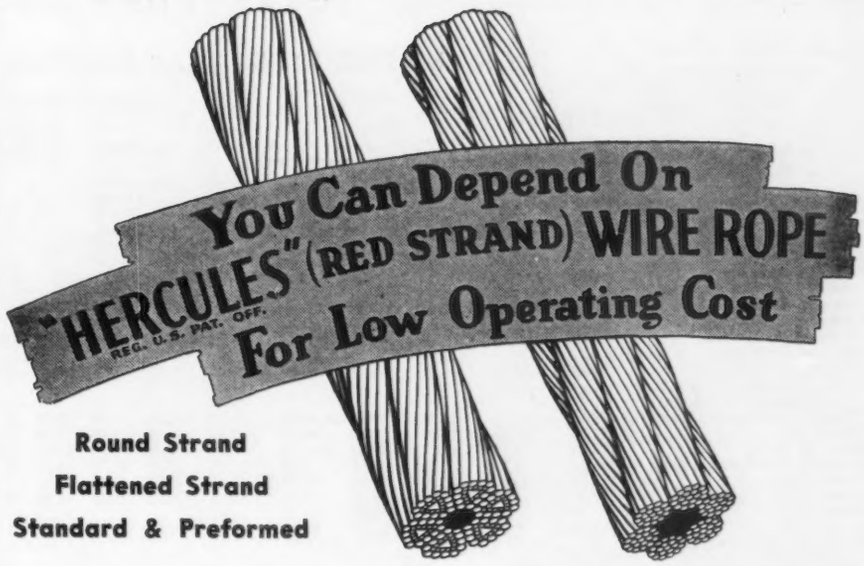
Canadian Dealers Licensed

Toronto

• • • **Scrap dealers** operating in Canada must be licensed by the Dominion Government, under a new order issued by the Steel Controller.



Round Strand
Flattened Strand
Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** *Established 1857*
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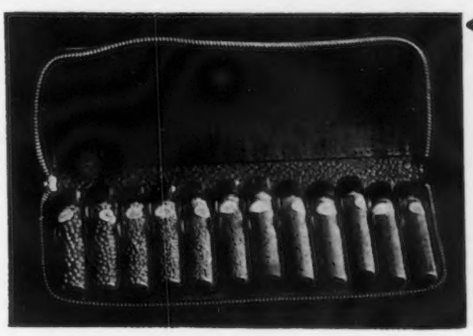

HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

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HARRISON ABRASIVE CORPORATION
Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
							Low Phos.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	....	12.85	12.85	13.85	14.85	15.35	....	....	....	....	....	....	....	....	....	....	....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

* Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the crresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their planes. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—$200 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Electrolytic Manganese

99.9¼ plus, less ton lots, per lb. 42c.

Spiegeleisen *Per Gross Ton Furnace*

Domestic, 19 to 21%	$36.00
Domestic, 26 to 29%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50
Buffalo 30.75
For each additional 0.50% Si add $1 a ton. For each 0.50% Mn over 1% add 50c. a ton. Add $1 a ton for 0.75% Phos or over.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome *(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)*

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese *(Per Gross Ton, Delivered, Carloads, Bulk)*

3 carbon	$120.00*
2.50 carbon	125.00*
2 carbon	130.00*
1 carbon	140.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over; maximum based on rate to St. Louis, Mo., per lb.	45c.
Bortam, f.o.b. Niagara Falls Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil—(3-4% Boron, 40-45% Si) per lb. contained Boron, f.o.b. Philo, Ohio	$7.00
Ferroboron — (15-20% Boron, 1.5% Si max., 1% Al max., 0.50% C max.) 2 in. and under, contract price per lb., gross ton lots	$1.25
Less ton lots	$1.35
F.o.b. Niagara Falls, Spot price 5c. lb. additional.	
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 718 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18% with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb.	7.50c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots freight allowed, per lb.	10c.
Silcaz No. 3—(35-40% Si, 9-11% Calcium, 6-8% Al, 3-5% Zi, 9-11% Ti, 0.40-0.60% Boron) F.o.b. Niagara Falls, per lb.	23c.

*Spot prices are $5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

COKE

Furnace

	Per Net Ton
†Connellsville, prompt	$6.50*

Foundry

†Connellsville, prompt	$7.25 to $7.50
By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. †F.o.b. oven.

FLUORSPAR

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail, net ton	$25.00
Domestic, f.o.b. Ohio River landing barges, net ton	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines, net ton	25.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick	*Per Net Ton*
Standard, chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

. . . Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Mar. 23, 1943	Mar. 16, 1943	Feb. 23, 1943	Mar. 24, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Mar. 23, 1943	Mar. 16, 1943	Feb. 23, 1943	Mar. 24, 1942
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.50	$6.00
Foundry coke, prompt	7.375	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 140 to 145.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Mar. 23, 1943	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	23.61	23.61	19.17	19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.39¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[13]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢[13]	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[14,15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

N. E. STEELS (Hot Rolled) Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

***Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.**

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅝ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ *in. and larger*)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets (7/16 *in. and smaller*)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect new 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.00	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.05 to 0.075 per cent nickel content and $1 per ton extra for each additional 0.025 per cent nickel.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	$4.00	$4.75	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.63	4.90	3.95	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.43	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.77	6.07	8.91	7.26
Birmingham	3.45[3]	.....	4.75[1]	3.70[3]	.....	3.55[3]	3.55[3]	3.50[3]	4.43	.....	.....	.....	.....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	5.00	5.05	4.00	.....	3.70	3.70	3.85	4.04	.....	.....	.....	.....
Cincinnati	3.42	4.37[2]	4.92[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	4.50	5.40	4.10	.....	4.05	4.05	4.00	4.15	.....	.....	.....	.....
Washington	3.60	5.10	5.15	4.10	.....	3.80	3.80	3.95	4.03	.....	.....	.....	.....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.52[1]	4.20	.....	4.15	4.15	4.10	4.42	.....	.....	.....	.....
Memphis	3.85	4.66	5.25	4.10	.....	3.95	3.95	3.90	4.31	.....	.....	.....	.....
New Orleans	3.95	4.95	5.25	4.20	.....	3.90	3.90	4.10	4.60	.....	.....	.....	.....
Houston	3.75	5.43	5.25	4.30	.....	5.25	5.25	3.75	4.50	.....	.....	.....	.....
Los Angeles †	4.95	7.15	5.95	4.90	.....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.55	6.60	4.50	.....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle †	4.65[7]	6.63	5.70[7]	4.25	.....	4.75	4.45	4.20	5.75	.....	8.00	.....	.....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

Restrictions on Farm Machinery Distribution Are Greatly Eased

Washington

• • • **The Department of Agriculture** last week removed entirely or eased restrictions on the distribution of a number of types of farm machinery.

One group of orders permitted manufacturers to release for immediate sale 100 per cent of their 1943 production of certain items of irrigation distribution equipment and 70 per cent of rationed types of farm pumps, windmills and domestic water systems. Sixty per cent of the 1943 production of this equipment was released on Nov. 28. In another group of orders, the Department permitted manufacturers of farm cream separators to release without restriction 80 per cent of their authorized production of separators as allowed by WPB Order L-170 and all remaining stocks produced under L-26. Similarly, permission was given manufacturers of spray pumps and horse or tractor drawn rod weeders to release 100 per cent of their production under L-170 and all inventory stocks produced under L-26.

The orders covering separators, spray pumps and weeders abolished previous quotas directing machinery into specified counties. However, in order that purchase certificates — which are still required before farmers can purchase such machinery — will not exceed the available number of machines, farmers to whom they will be issued will be required to locate the machinery they wish to buy in dealers' hands.

The orders affecting irrigation distribution equipment, farm pumps, etc., left unchanged the requirement for purchase certificate issued by the County Farm Rationing Committee in making sales of irrigation equipment. The types of irrigation distribution equipment affected are: Land leveling equipment, ditchers, corrugators, and scrapers.

The other items affected are: Deep well domestic water systems; shallow well domestic water systems; domestic water systems having horizontal-type power pumps, up to and including a capacity of 75 gal. per min., 100 lb. pressure; windmill pumps, heads, and towers; pump jacks; hydraulic rams, portable pipes and extensions, and sprinklers.

Manufacturers' production of one and two horse-operated stationary hay balers, previously restricted to 60 per cent release, are now 100 per cent released. These balers are used principally in the South. No production of this model is authorized for 1943.

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Allotment Requests Asked Of Farm Equipment Makers

• • • **Producers of farm** machinery and equipment who find they have not obtained sufficient supplies of controlled materials to produce the limited quantities assigned up to Sept. 30 next are advised to file immediately supplemental applications on form CMP-4B. This was included in a circular of instructions to all producers of farm machinery and equipment, signed by George Krieger.

Each producer should immediately determine whether or not his current CMP-4B applications include sufficient controlled materials to produce the portions of his domestic quotas which he intends to build prior to Sept. 30, 1943. Revised quotas now shown on Schedule A were previously released as "tentative" additions to original quotas so that CMP-4B applications could cover the revised program.

Every producer who finds that his current CMP-4B applications did not include sufficient controlled materials to finish production to whatever portions of his revised quotas he intends to build prior to Sept. 30, 1943, should immediately file additional CMP-4B applications for the additional quantities of controlled materials he will require. Conversely, any producer who applies for more controlled materials than will be needed to accomplish his revised production should immediately revise his present CMP-4B applications by letter.

Casting Price Determination

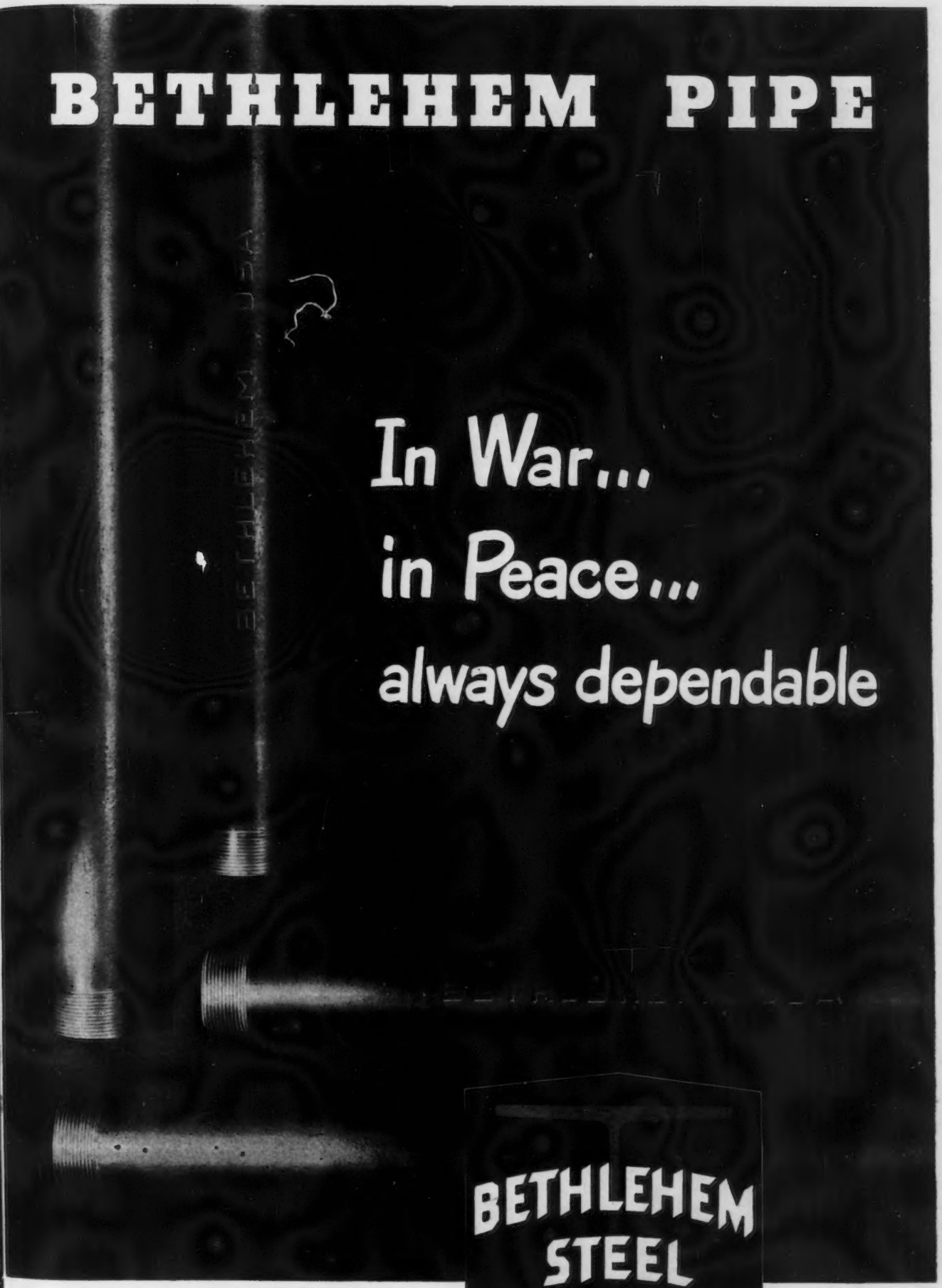
• • • **Amendment No. 4** to Maximum Price Regulation No. 244 issued by OPA this week permits sellers of products containing gray iron castings or the castings alone to determine whether their products should sell under the maximum price regulation for gray iron castings or some other price regulation.

• • • Pig iron production in February fell off to 4,710,109 net tons from 5,136,543 tons the previous month, according to the American Iron and Steel Institute, but the daily rate for the 28-day period was higher by about 2500 tons. Ferroalloy production was down to 55,892 tons compared with 57,702 tons smelted during January.

BLAST FURNACE CAPACITY AND FEBRUARY PRODUCTION—NET TONS

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO MANGANESE AND SPIEGEL		TOTAL		Percent of Capacity	
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,868,680	867,361	1,837,642	17,703	35,312	885,064	1,872,954	89.7	90.0
Pittsburgh-Youngstown	15	25,732,160	1,977,958	4,104,341	18,498	38,514	1,996,456	4,142,855	101.1	99.6
Cleveland-Detroit	9	6,125,110	462,156	985,123			462,156	985,123	98.4	99.5
Chicago	6	13,081,540	1,012,207	2,120,603			1,012,207	2,120,603	100.9	100.3
Southern	7	4,425,540	319,514	671,728	19,691	39,768	339,205	711,496	99.9	99.4
Western	2	1,134,100	70,913	143,720			70,913	143,720	81.5	78.4
Total	37	63,367,130	4,710,109	9,863,157	55,892	113,594	4,766,001	9,976,751	98.0	97.4

BETHLEHEM PIPE



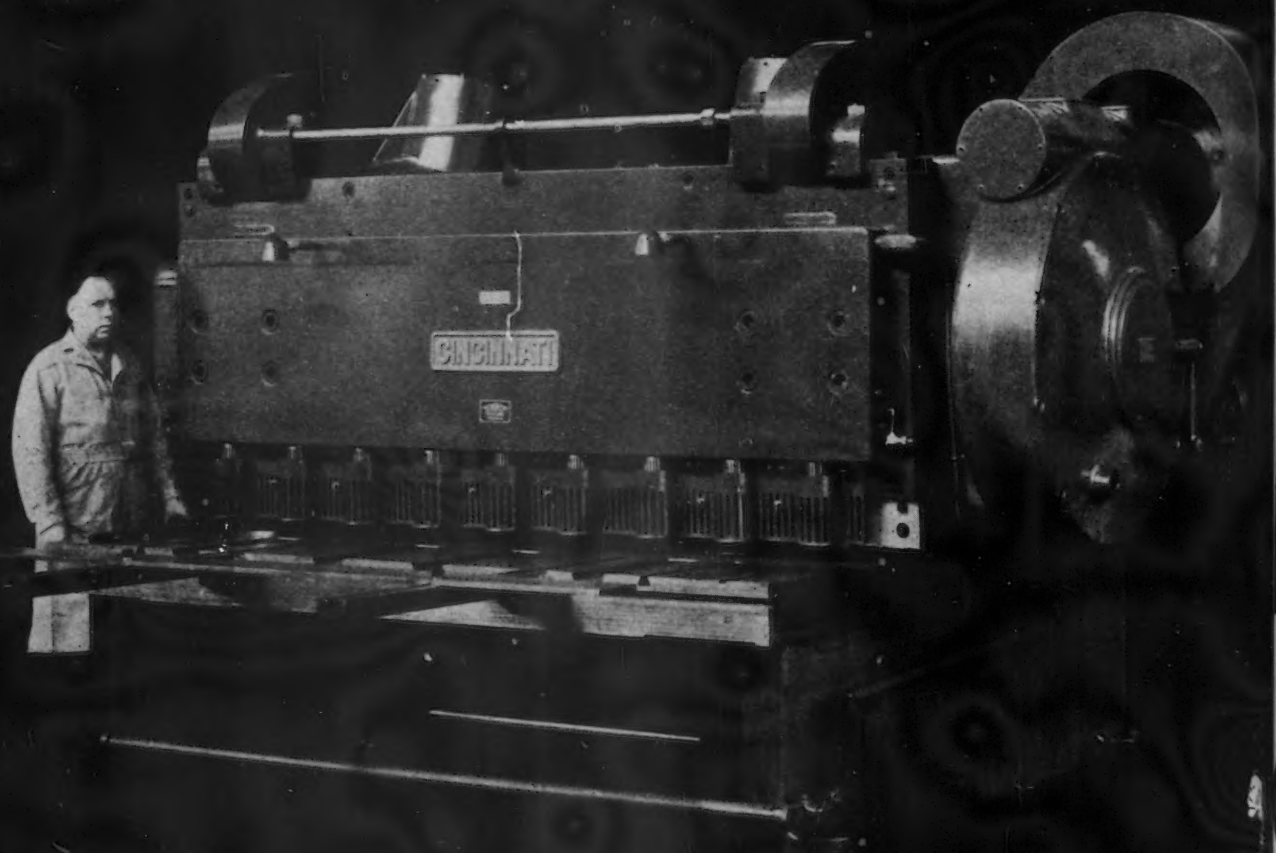
In War...
in Peace...
always dependable

BETHLEHEM STEEL

SHEARING 1" PLATE to a SQUARE EDGE

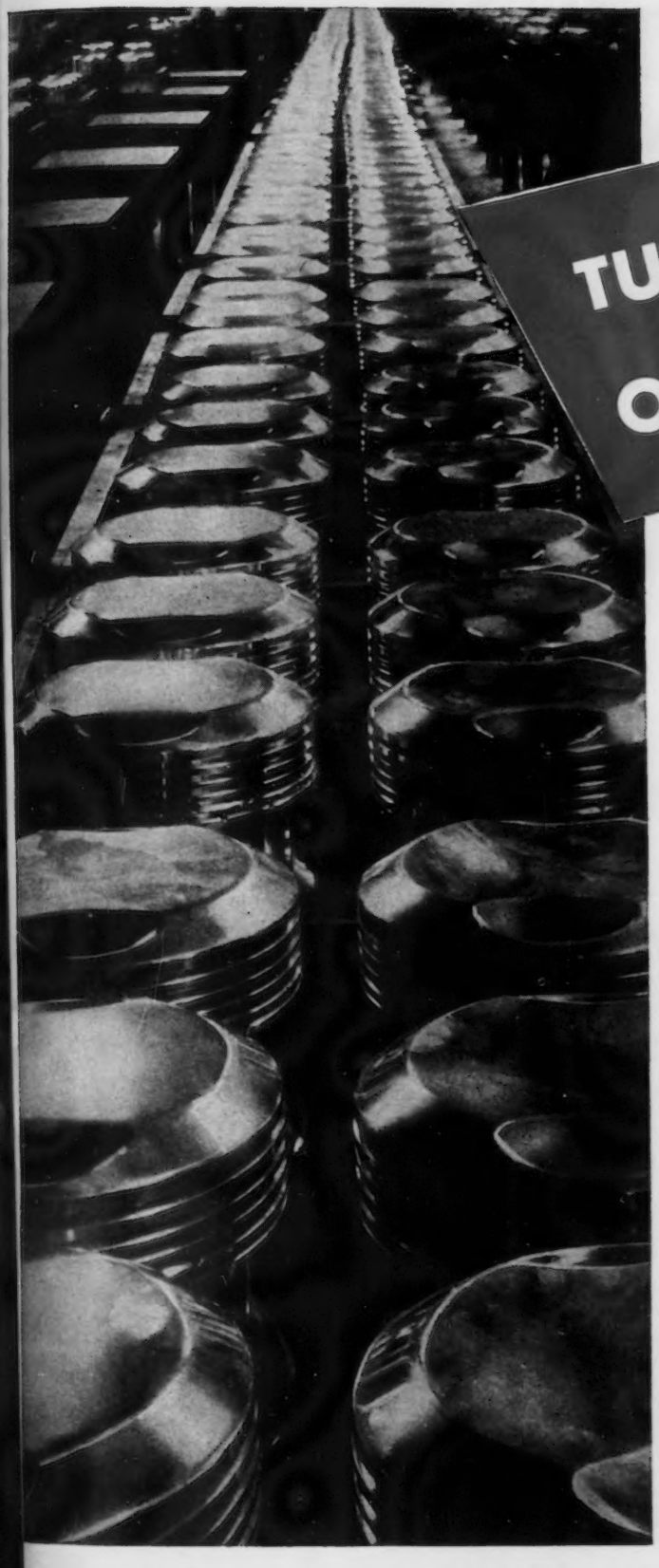
. . . exclusive features of the Cincinnati All-Steel Shear give accurate, square cuts. 46 standard sizes . . . capacities from 10 gauge to 1¼".

Write for recommendations on your job.



THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

SHAPERS · SHEARS · BRAKES



TURNING THEM OUT *Faster*

IN MEETING the Government's goal of 10,000 planes a month, improved machining practice has been continuous.

A recent example is the machining of aluminum and magnesium alloys in engine plants, where an entirely new cutting coolant is permitting faster cutting speeds ... *Texaco ALMAG Cutting Oil.*

Equally suitable for both *al*uminum and *mag*nesium, *Texaco ALMAG Cutting Oil* adequately cools and lubricates the cutting tools, prolongs their life, increases cutting speeds, steps up output. *ALMAG* is transparent, permitting the operator to *see* ... and is non-irritating to the skin.

So effective have Texaco Lubricants proved that they are definitely preferred in many other important fields, a few of which are listed below.

A Texaco Lubrication Engineer specializing in cutting coolants will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 E. 42nd St., New York, N. Y.

THEY PREFER TEXACO

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

TEXACO REG. T. M.

TEXACO Cutting and Soluble Oils

FOR FASTER MACHINING

1917 - 1943

AGAIN ---

History repeats itself

IF YOU ARE . . .

Drilling, reaming or rifling gun barrels ★ Machining shells ★ Thread grinding ★ Honing ★ Machining aluminum or magnesium ★ Shaping gears ★ Machining other tough jobs

Consult Houghton on Cutting Fluids

USE HOUGHTON'S CUTTING

Once more industry turns to cutting concentrates to save needed shipping space

Buy the BASE and SAVE the SPACE

During the dark war days of 1917 the railroads, sorely pressed, were forced to place embargoes on many materials. Some way had to be found to keep machine shops supplied with the cutting oils they required in increasing quantities for war production.

It was then that the Pressell patent (1367428) was granted to E. F. Houghton & Co., on a cutting oil base which contained the necessary extreme-pressure ingredients to increase film strength, oiliness and heat absorbency. This base was shipped to the user's plant and mixed there with blending oil obtained locally.

Down through the years this method of making superior cutting oils has continued. We have supplied thousands of tons of cutting concentrates, high in the right type of sulphur, saponifiable and E. P. properties.

This means that one drum will make from two to ten drums of mixed oil, ready to cool the operation and make tools last longer.

Today history repeats itself. The common carriers—railroads and trucks—have done a marvelous job to meet war demands thus far. But the time has come when shipping space is probably America's greatest shortage . . . when every possible car must be conserved to move the materiel of war and the food and fuel for our home front.

By buying the treated base oil and mixing it with a locally available straight-run refinery product, shipments of cutting oils can be cut to one-third or even one-fifth of the present volume. Too, metal drums are getting scarce —which is another reason for conserving.

"BUT, WHAT BASE?"

This company, with a quarter-century record on cutting fluids, has long since proven its right to speak. We make our own ready-to-use oils the same way and supply both these oils and the concentrates to American industry for every conceivable type of tough machining.

Why not ask the Houghton Man for his recommendation—buy the base material made as only Houghton knows how to make it—and thereby save time and shipping space for other materials vitally needed for Victory?

E. F. HOUGHTON & CO.

Industrial Oils and Heat Treating Products

Chicago • PHILADELPHIA • Detroit
San Francisco • Toronto

CONCENTRATES

GE Electronics REVOLUTIONIZES VARIABLE

New G-E THY-MO-TROL Drive Gives You Full-range, Stepless Speed Control

● *D-C ADVANTAGES FROM A-C POWER*

Complete Drive — Nothing Else to Buy. Thy-mo-trol drive is a complete equipment operating its d-c motor from your a-c power line. Starts, accelerates, controls speed, stops by dynamic braking, and reverses the motor—all from a single, compact, control station. And it fully protects the motor.

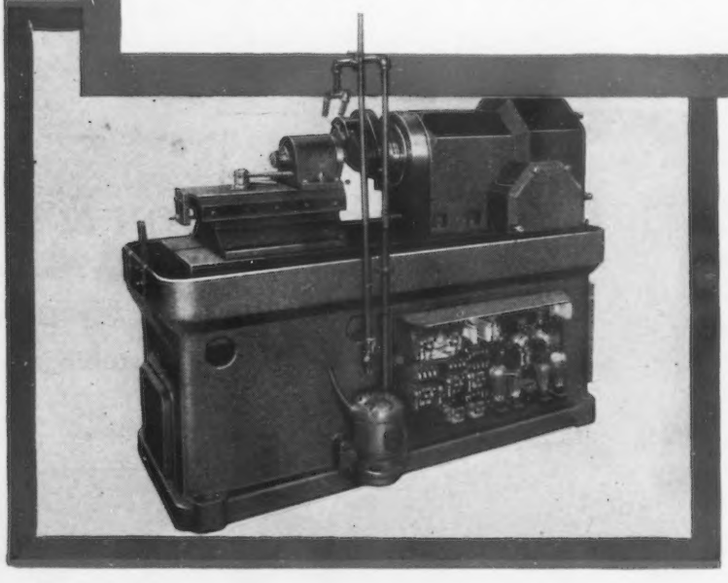
Makes available previously unused advantages of d-c motors, such as:

1. Full-range, Stepless Speed Control. A single dial—small as a radio volume control, and mounted in the push-button control station—gives complete adjustment of motor speed, from zero to maximum, *without steps*. No belts, gears, or clutches needed to change speed. Gives you the exact speed you want, whether it be for roughing or fine finishing.

2. Holds Speed under Changing Load. Regardless of load fluctuations—if they're within the power range of the drive—Thy-mo-trol electronic circuits hold speed constant within extremely narrow limits. With Thy-mo-trol drive you get both full speed-range and a flat speed-load characteristic.

3. Full Torque at Low Speeds. Though the motor may be scarcely turning over, it will deliver *full torque* right up to the stall point! That means greater output than with other drives. And the motor is fully protected at all times.

4. Current-limit Acceleration. Regardless of the speed-control setting when the START button is pushed, Thy-mo-trol acceleration is smooth because of electronic current limiting. Yet you get fastest possible starting because of sustained maximum torque during acceleration. No shock to your machine due to sudden



Already — Operating Results!

Thy-mo-trol drive—built into this planetary milling machine made by Plan-O-Mill Corporation—provides automatic cyclic control of feed-in, feed-around, and rapid reverse, each at a different preset speed. Plan-O-Mill engineers selected Thy-mo-trol drive for its compactness, stepless speed control, low cost, and simplicity. They have found that tool life is greatly lengthened by using correct speeds for each operation, and by being able to start the tool at low speed with full torque.

SPEED DRIVE!

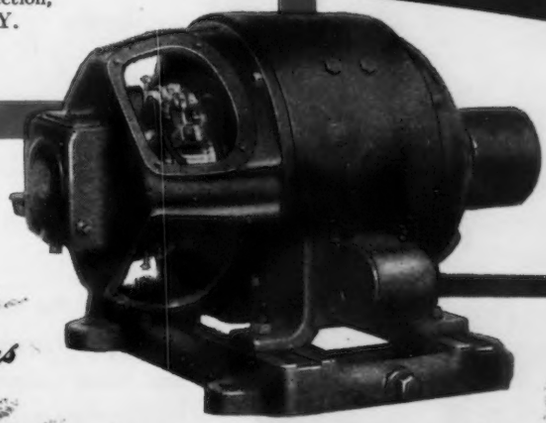
FULL CONTROL with a SINGLE DIAL

application of excessive torque. No current peaks on the line.

Dozens of Other Thy-mo-trol Extras . . . such as: low maintenance (by elimination of moving parts); speed can be preset before starting; saves space; no stop for speed change; easy to control automatically; operates direct from a-c line—no motor-generator or other special d-c supply needed.

Where Has It Been Applied? Drill presses, to increase speed range and size of work handled. Grinders, for precise speed selection and improved finish. Milling machines, to increase range of work handled, and to simplify design. Propeller testing, for accurate, smooth speed control. Cable reelers, to maintain constant tension. Conveyors, to match speeds.

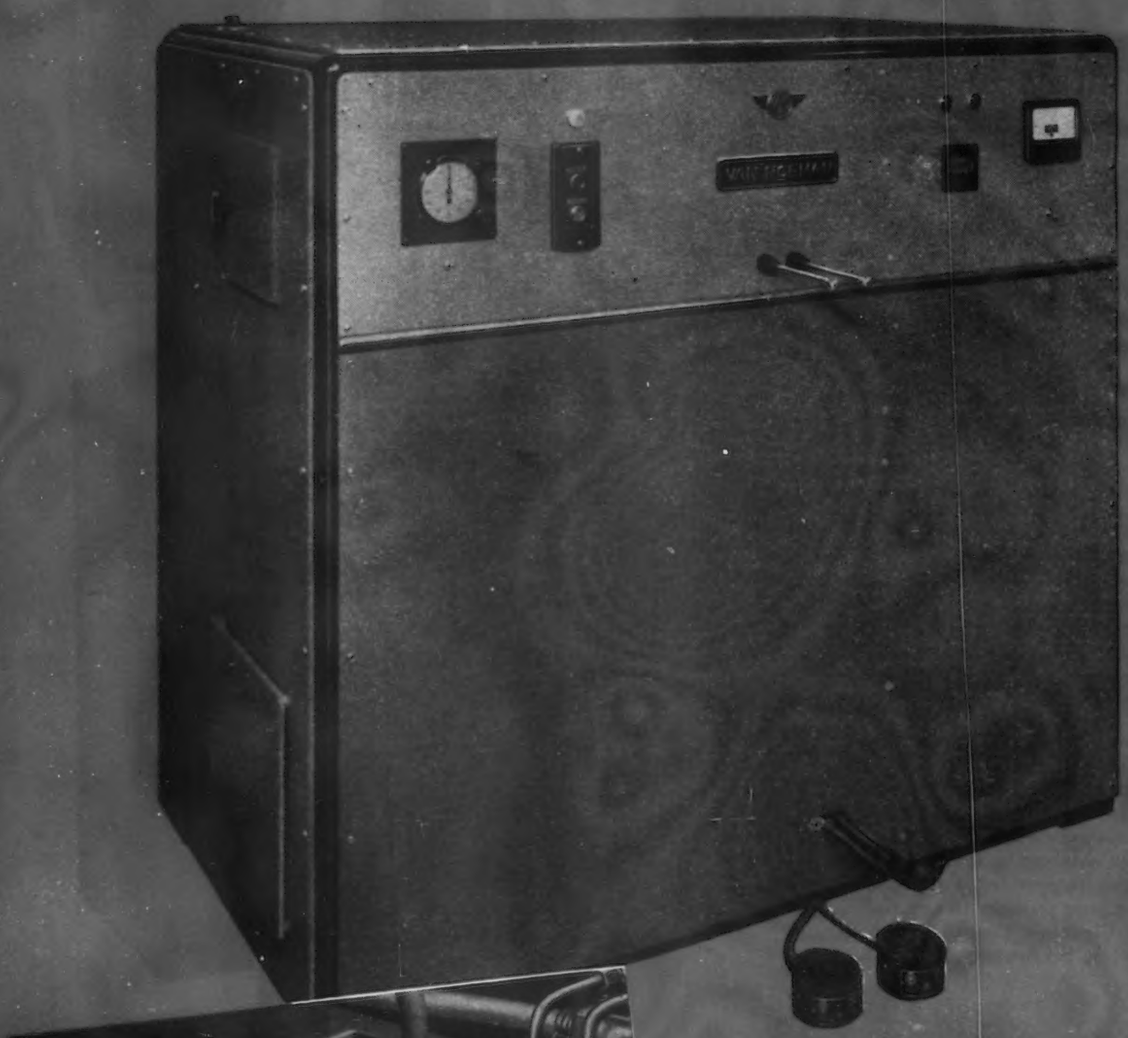
How to Buy Thy-mo-trol Drive. Because *electronic* motor control offers so many advantages through improved machine design, performance, and operating technique, G-E engineers want to consider each of *your* problems as an individual case. Standard Thy-mo-trol drives can be obtained in sizes up to 10 hp. Special types can also be provided. For further information write, stating your problem, to any G-E office, or to Electronic Control Section, General Electric, Schenectady, N. Y.



Another FIRST in Industrial Electronics by

GENERAL ELECTRIC

Surface Harden Parts



To harden the various surfaces of the part shown, a horizontal work-holding fixture is used. The part has three separate hardening operations. The holding fixtures and heating coils for the other two hardening operations are quite similar in design.

In Seconds

with VAN NORMAN INDUCTION HEATING UNITS

SELECTIVE HEATING SAVES TIME, PROVIDES UNIFORM HARDENING, INCREASES OUTPUT

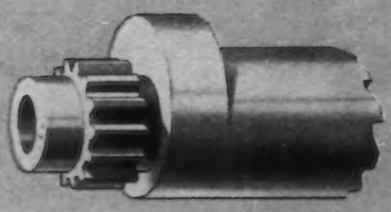
Van Norman Induction Heating Units enable manufacturers to surface harden parts in seconds as compared to hours when other methods such as carburizing are used. This important time-saving feature increases production and reduces costs. Since induction heating localizes heat only the section to be hardened is heated instead of the entire work piece, as when other methods are used. This feature alone reduces heating time and costs. In addition, parts, such as the teeth of a gear, are heated to provide the exact hardness wanted and to a predesired depth with practically no change in the structure of the untreated portion of the part. Induction heating eliminates possible warping and distortion and leaves the work free from undesirable scale. And because the heating and quenching time is automatic, chance of human error is eliminated and part after part is turned out with *identical* characteristics. Illustrated at right are a few typical hardening applications. Write, on company letterhead, for the new descriptive bulletin.

Van Norman Machine Tool Company

Springfield, Massachusetts

The teeth of each gear section of a cluster of gears can be surface hardened, in a few seconds, to the desired Rockwell hardness for greater wear resistance. In the illustration, each gear section is hardened separately.

Surface hardening rack teeth is a matter of seconds with induction heating. Teeth are simply held over a flat or "pancake" type heating coil for the prescribed number of seconds, followed by a cold water quench.



The part illustrated has three separate localized hardening operations. Gear teeth are hardened to 52-55 Rockwell C, the eccentric surface to 60-62 Rockwell C, and the clutch teeth are hardened to 56-58 Rockwell C.

Two surfaces for needle bearings are surface hardened to 62 Rockwell C on the shaft illustrated. Because heat is localized, the rest of the shaft is unaffected by the heating operation, and a straightening operation is eliminated.

OTHER APPLICATIONS

Brazing, soldering, annealing, forging, melting, and other applications requiring localized heat.

We'll help protect

him, Mrs. Smith!

—but we'll need the full cooperation of every steel fabricating plant to do it

Mrs. Smith—or maybe you're Mrs. Kelly or Cohen or Jankowsky—it makes no difference, because each of you has a boy in the armed forces of our country.

Is he on Guadalcanal, in North Africa, in Australia, in Iceland, Mrs. Smith? That's where our boys are, too. You see, thousands have gone from the mills, mines and offices of the steel industry (more than 13,000 from Republic alone). Thousands more in service are sons or brothers of steel workers.

So maybe your boy, in a sense, is our boy. But does it matter? We want all of them to come home victorious—and safe—just as soon as possible.

And that, Mrs. Smith, is where we, the steel industry, can help—by furnishing enough of the strong, tough alloy steels needed to produce the best, the safest fighting tools in the world for your boy. But—to do so, WE MUST HAVE THE FULL COOPERATION OF EVERY STEEL FABRICATING PLANT.

Fabricators MUST segregate Alloy Steel Scrap—or schedules may COLLAPSE!

Alloy steels cannot be made without nickel, chromium, molybdenum or other critical alloying elements. And such materials are scarce—growing scarcer every day. There just isn't enough to go around now. So what about the future?

Here's what! We must reclaim every possible ounce of alloy from steel scrap.

Every time you machine alloy steels, substantial quantities of alloying elements go into the scrap pile. But unless you keep each lot of alloy steel chips, turnings, shearings and other scrap separate—segregated at the machine and correctly labeled with its grade number (SAE, AISI, NE or other), the maximum value of those alloys may be wasted, even lost.

To charge scrap of unknown alloy content into the furnace may mean possible loss or waste of the alloys—possible ruin of that heat of steel—certainly, disruption of melting schedules. On the other hand, the only way we can determine the alloy content of mixed, unmarked scrap is by melting it down and pouring it into ingots, wasting the time of furnaces and skilled crews which should be producing usable steel.

Chemists and metallurgists must take time to analyze the ingots to determine what and how much alloys they contain. Finally, the scrap ingots must be remelted again when the desired analysis is being produced. That is waste of materials, manpower, time—costly waste.

We know you're busy—that you face many problems—*BUT THIS IS EQUALLY IMPORTANT*—and can be taken care of in a hurry. Just take a few minutes *right now* to issue an order to your plant to segregate alloy steel scrap, *mark* it correctly and return it *promptly*. While you're at it, make some one responsible for checking at least once a week to see that your order is being carried out. You'll help protect Mrs. Smith's son—maybe your own son—and, incidentally, the American System of Free Enterprise which made your business possible.

This Advertisement Sponsored by

REPUBLIC STEEL CORPORATION

Alloy Steel Division Sales Offices: Massillon, Ohio • General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division • Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company • Export Department: Chrysler Building, New York, New York

In Cooperation with the U. S. Government's Salvage Campaign

Poster size reprints of this advertisement and wall cards giving official W.P.B. alloy scrap classifications will be sent upon request.

VIA ALASKA HIGHWAY

Our Northern front is now not only protected, but is set up for attack. In this triumph of American and Canadian ability to do what couldn't be done, both men and equipment did their work well. Credit must also be given the manufacturers who delivered *on time* the trucks, tractors, shovels, bulldozers and other rugged construction equipments which stood up so well in service that was the ultimate in severity.

Kropp Forge is proud of having furnished many tough stress and shock-resisting forged parts for the many equipments used in building the Alaska Highway; also of the fact that we made our deliveries *on time* to aid the builders of these massive construction machines.

Wherever dependable forgings are needed for the war effort, the greatly increased facilities of Kropp Forge are equal to the task of delivering forged machine and equipment parts *on time*.

SERVING INDUSTRY 18 SINCE 37 K KROPP FORGE CO. OVER 100 YEARS

Proudly we fly the Army and Navy "E" flag and stars, awarded and re-awarded for excellence and proficiency in the production of war materiel.

KROPP FORGE COMPANY

Makers of Drop, Upset and Hammer Forgings for Ships, Guns, Planes, Tanks, Ordnance and Machine Tools.

"World's Largest Job Forging Shop"

5301 W. Roosevelt Road

Chicago, Ill.

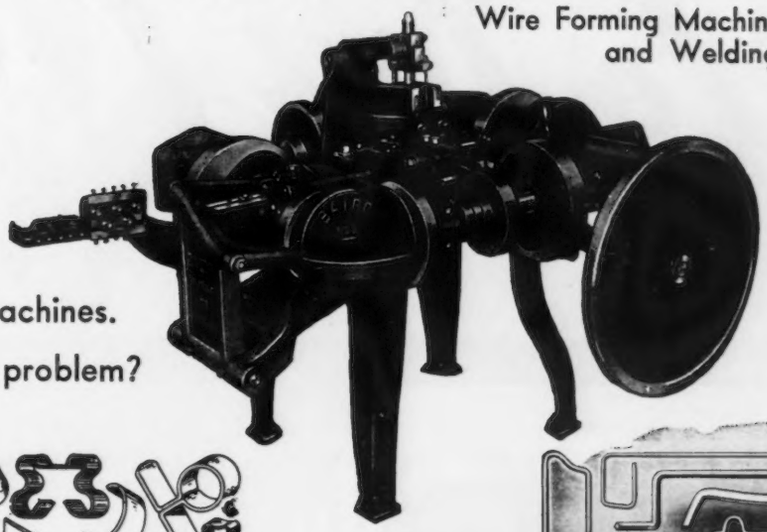
Engineering Representatives in Principal Cities

KROPP

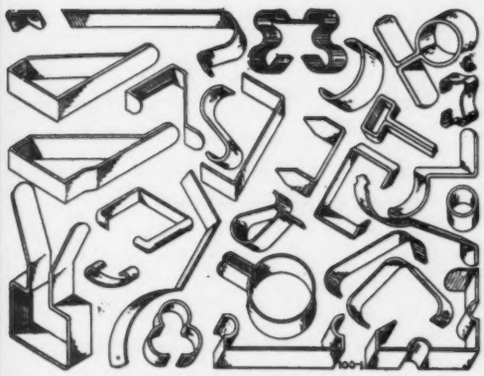
BAIRD PRODUCTION MACHINES

Reduce costs of goods, enabling more people to buy and the increased demand makes more work and more jobs mining and rolling metal or drawing wire, etc., from which to make the goods.

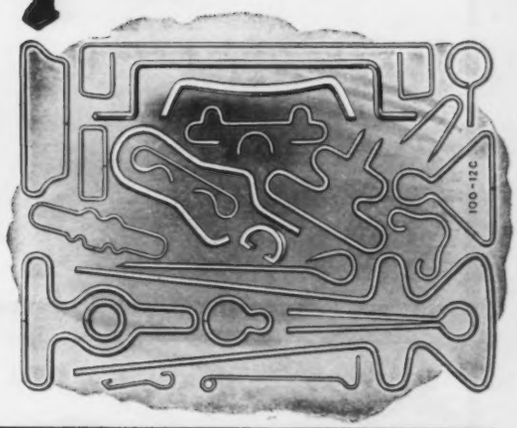
Ribbon Metal Forming Machines. Special High Production Machines. What is your problem?



Wire Forming Machines. Wire Forming and Welding Machines. Machines to make chain clips, fasteners, pins, hinges, hangers, buttons, buckles, thumb - tacks, bails, hairpins, safety pins, springs, etc.



The articles shown opposite illustrate some forms made on BAIRD Four Slide Wire and Ribbon Metal Forming Machines as shown above.



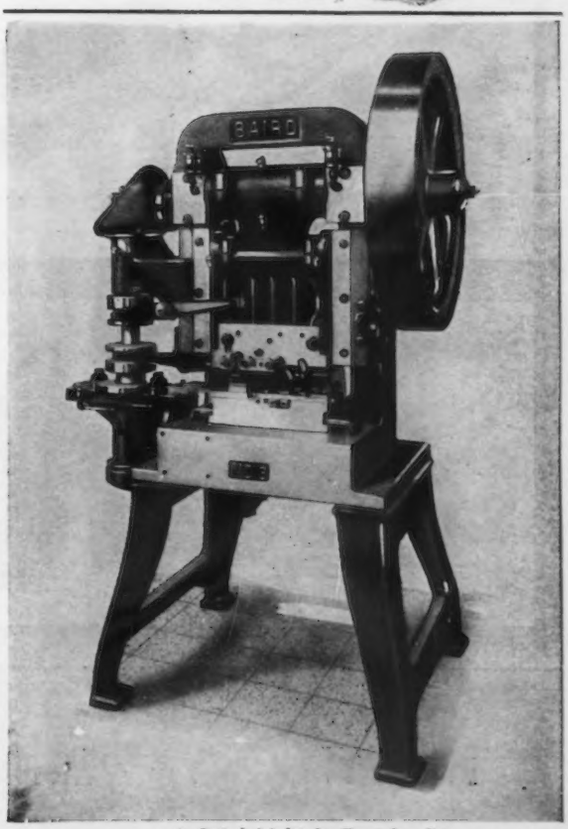
Foot Presses

Automatic Open Back Presses

" Pillar Presses
" Single Transfer Presses
" Multiple Transfer Presses
" Tandem Presses
" Special Presses
" Machinery Since 1846

"Ask BAIRD About It"

THE BAIRD MACHINE CO.
BRIDGEPORT, CONNECTICUT



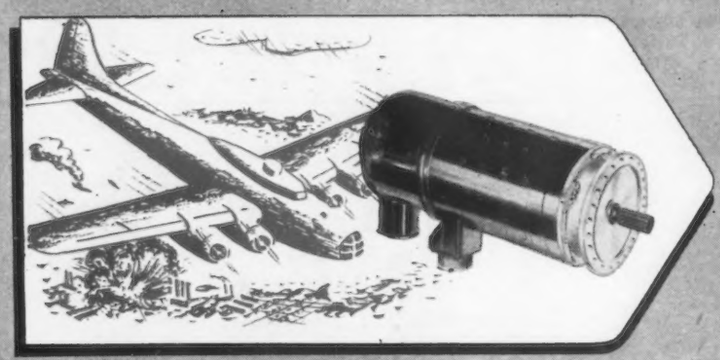
A Baird Multiple Transfer Press

Do You Need

MOTORS FOR NAVAL APPLICATION

In a space of *five weeks*, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

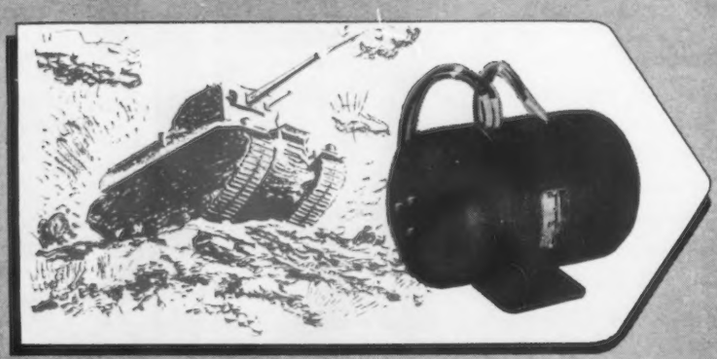
★



A SMALLER, LIGHTER GENERATOR FOR AIRCRAFT

A generator *one-sixth the weight* of comparable industrial types was developed, meeting stringent specifications for high-altitude performance—a typical example of ingenious G-E design.

★



A SPECIAL DYNAMOTOR FOR USE ON TANKS

To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

Builder of TRI-CLAD Motors ★ AMPLIDYNES AIRCRAFT POWER PACKAGES DYNAMOTORS GENERATORS EVERYTHING IN MOTORS

FIGHTING MOTORS*?

WE MAY BE ABLE TO HELP YOU

WE invite builders of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Co., Schenectady, N. Y.*

* **"FIGHTING MOTORS"** is our term for electric motors in equipment used by our fighting forces — motors which contribute to combat efficiency. In contrast to motors used for production, they may be designed, and produced by the thousands, and declared obsolete — all within a few months.

Fighting motors often require amazing ingenuity in their design, always demand the utmost in reliability, and must be produced with a new concept of speed. They are truly *life or death motors.*

GENERAL ELECTRIC

ARMY E NAVY

When you gotta jump—you gotta jump! It's great to have that feeling of confidence that comes from knowing every part of the 'chute is as trustworthy as human hands and machines can make it.

Confidence in all equipment for defense—in its superiority and dependability—instills the victory spirit in our armed forces.

Indirectly helping to build this confidence is our big job—competently handled by veteran springmakers with a record earned in peace-time for springs and small stampings of integrity.

Wallace Barnes Company

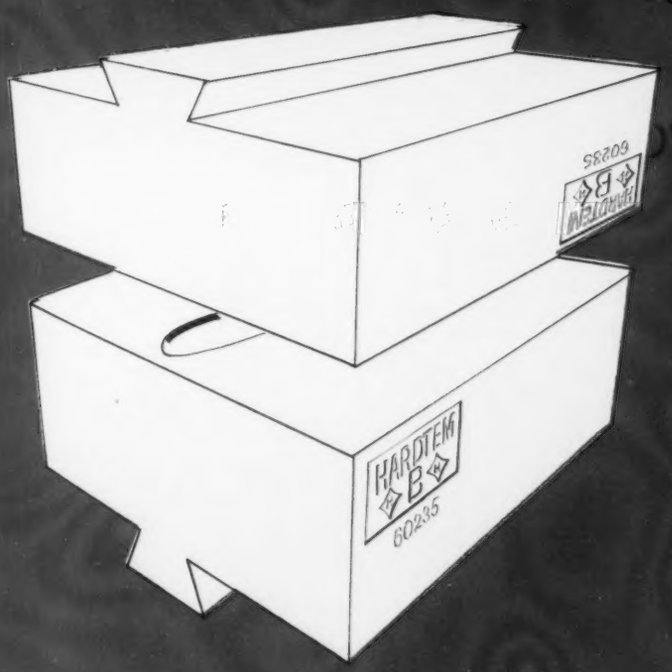
DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT, U. S. A.

Barnes-made Springs *for Victory*

NOTICE

Heppenstall Hardtem Die Blocks



can now be delivered more promptly*

*Due to greatly expanded production facilities, Hardtem Die Blocks are currently available for quick delivery on AA and AAA ratings.

Heppenstall quality standards are unchanged. Hardtem Die Blocks are still scientifically forged from the best acid open hearth alloy die block steel and heat treated by the exclusive Hardtem process which assures you more forgings per sinking. To obtain die blocks in a hurry, write or phone Heppenstall.

Heppenstall

PITTSBURGH · DETROIT · BRIDGEPORT
EDDYSTONE

Forging Fine Steels for Fifty-Three Years

METAL FOR 550 BOMBERS

. . . saved by Redesigned Cartridge Tanks!

Here is a redesign idea that paid off:

An alert designer substituted steel for a more critical metal in the construction of cartridge tanks for anti-aircraft shells. On one order for a million and a half tanks, this "converted" design saved enough of the scarcer metal to make 550 new bombers for the United Nations!

But this isn't the whole story. Sixty-eight *years* of machine hours were saved! The new steel cartridge tanks are formed on mass-production presses. Two half-rings for the top, formerly machined, are now formed and seam-welded in a jiffy!

This is only one example of conversions from critical alloys to steel, and from machined parts to stampings. Our planes and ships, shells and bombs are proving the versatility of modern special-purpose sheet steels.

Whether you are working on new war-winning ideas or thinking of peacetime products, perhaps ARMCO specialty sheets can help you solve your metal problems. For information about both new and improved special-purpose steels, just write The American Rolling Mill Company 921 Curtis Street, Middletown, Ohio.

SPECIAL PURPOSE ★ ARMCO ★ SHEET METALS

THE AMERICAN ROLLING MILL COMPANY

YOUR LIFE WILL BE . . .

Perhaps you take no stock in things occult! Perhaps you wouldn't believe what this mystic might predict. And we don't ask you to. But it *is* entirely possible to peer into the future lives of rotating parts. In fact, it's being done every day—through the medium of the Dynetric Balancing Machine. And it's done for thoroughly practical reasons—to detect and correct their weaknesses in static and dynamic balance—to protect them against vibration and excessive wear—to insure the longest possible life and the most efficient service. And there's nothing mysterious about it!

At Gisholt, the Army-Navy "E" and the Treasury flag fly side by side.

GISHOLT MACHINE COMPANY
1211 E. Washington Avenue
Madison, Wisconsin

GISHOLT DYNETRIC BALANCING MACHINES *enable you to foresee the hazards which affect high speed rotating parts and to eliminate them. Electronic tubes clearly reveal unbalanced vibrations by amplifying them as much as 1,600,000 times. Literature on Dynetric Balancing is yours on request.*

GISHOLT

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

THEY COULD USE THIS

THAT HALF-TRACK can be mighty useful, on a farm or construction job. It can save time and back-breaking work, in a hundred and one ways. The men in our armed services realize it. They're waiting for a chance to use it, back home.

OTHERS SEE the utility of planes, jeeps, powerful trucks for peacetime pursuits. Homemakers will clamor for better equipment for comfort and convenience. And they'll have the money to buy, invested in War Bonds or otherwise.

BUT they'll be cagey shoppers, we think. They won't be satisfied with the old. They'll be looking for manufacturers to apply the lessons of war to peacetime goods. The pressure now is for deliveries. The postwar demand will be for more over-all utility, at a fair price.

WE DOUBT that this country's present machinery will do the job. Much of it is years old, depreciated even before the War. Heavy loads and long hours have reduced the value of new machines. New developments will cause a high degree of obsolescence, even of equipment still in good order.

SO, the manufacturer will be a jump ahead of his competitors, who starts now to study his postwar facilities. He'll find out what machinery he can use, what is outworn or outmoded. He'll plan to use the most productive machinery he can obtain.

TAX AUTHORITIES CAN HELP, by considering the rapid rate of depreciation and obsolescence, and by permitting the reservation of "seed money" so that funds will be available when new equipment is obtainable.

WE SHALL LOSE MUCH of the value of our native ingenuity if we are not ready to apply it to peacetime pursuits. Only the production of more goods for more people, by means of modern machinery, can bring us work, contentment, and lasting freedom.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

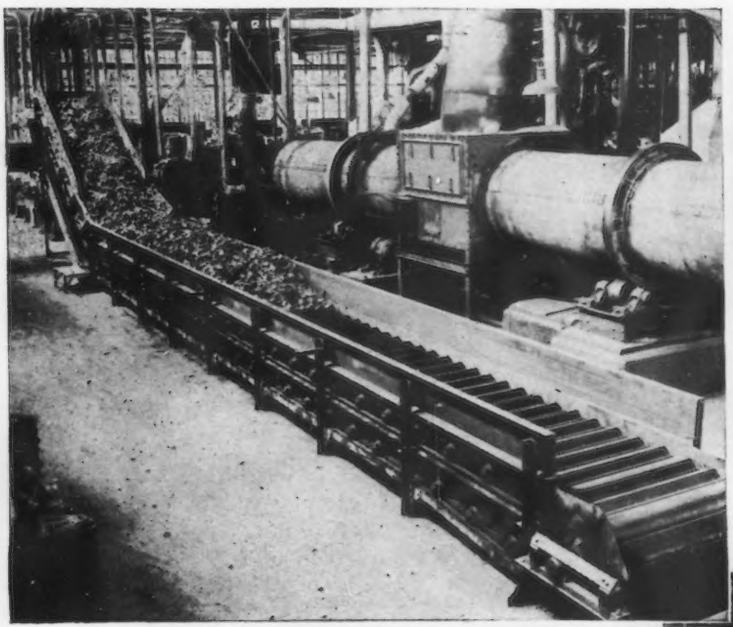
Cover the Turning Field

back on the FARM

Speeding to Victory on LINK-BELT CONVEYORS

★ ★ ★ ★ ★ ★ ★

AMERICAN GENIUS FOR MASS PRODUCTION IS CONQUERING THE TIME ELEMENT

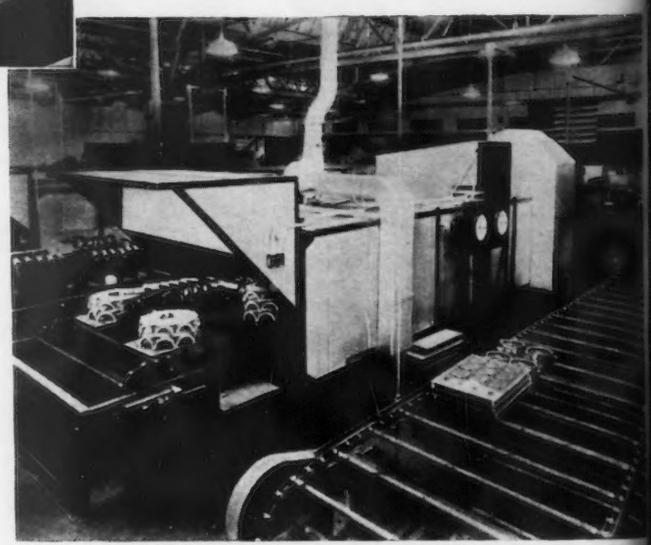


Link-Belt apron conveyor handling hot castings through continuous anneal, sorting and cleaning to shipping.

Link-Belt overhead trolley conveyor handling 155-mm shells and steel scrap. This type of conveyor has great possibilities in flexibility of arrangement, capacity and length.

● Production methods in this war have developed a new functionary: the expediter—one who clips minutes, hours or days from production schedules by speeding the movement of materials and products into and out of plants. Within the plants, from stage to stage of production, from machine to machine, as well as outside, Link-Belt conveyors are nipping minutes, from processes or intervals; bits of time that total up to huge aggregate savings, helping to bring true the production man's dream of "Plenty, On Time, and Right."

Link-Belt Company has long specialized in the engineering and manufacturing of practically every type of mechanical conveying equipment for all industries, and our engineers are ready to show you how to use efficient handling systems to save time and manpower and speed production.



Conveyors using Link-Belt SS-4 chain with cross pipes, handling airplane motor parts to and from continuous conveyor-type oven built by The Gehnrich Corporation.

LINK-BELT COMPANY

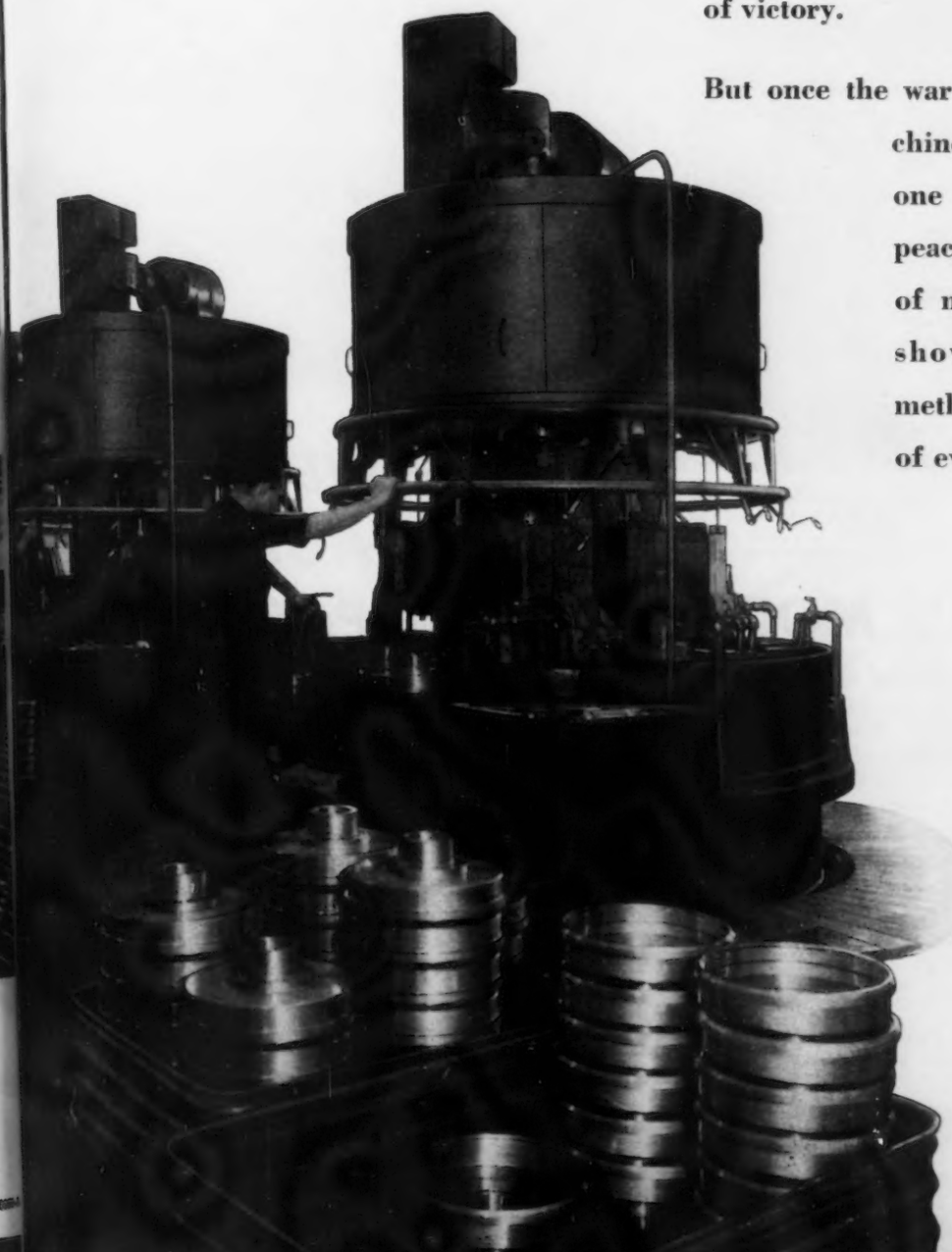
Leading Manufacturer of Materials Handling and Mechanical Power Transmission Machinery
Chicago, Indianapolis, Philadelphia, Atlanta, Dallas, San Francisco, Toronto
Pittsburgh, Cleveland, Detroit
Offices, warehouses and distributors in principal cities

THROW YOUR SCRAP INTO THE FIGHT!

when the WAR is FINISHED BUSINESS...

As long as we need fighting planes, these Mult-Au-Matics will work hard at their present job. Their swift work is speeding the day of victory.

But once the war is won, these versatile machines can be quickly retooled for one or more of thousands of peacetime tasks. The experience of many plants is on record to show that the Mult-Au-Matic method effects economies on runs of even as few as 200 parts.



Rough and finish machining of reduction gears which are Nitralloy Steel forgings on a battery of Bullard Type "D" Mult-Au-Matics in an aeronautical plant. The 7 working stations, with independent speeds and feeds make possible all the work on these gears with but two chuckings.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Beading operations are easily and quickly performed on a Steelweld. This shows the third and final step in wrapping the edge of a body panel around a pipe to secure the rigidity necessary.

STEELWELDS HELP SEAGRAVE BUILD MODERN FIRE APPARATUS

Body panels, hoods, fender aprons, dashes, running boards, gas tanks, and other parts for the pumpers, ladder trucks and fire-fighting equipment made by The Seagrave Corporation, Columbus, Ohio, are fabricated on their two Steelweld Bending Presses.

These parts requiring bending, forming, louvering, beading, punching and notching, are formed a few at the time in production runs as the demand requires. It is easy to switch from one operation to another because it is a quick, simple matter to change the dies.

The satisfactory performance of the first press, a model I-10 installed in 1936, led to the purchase of a second machine in 1941, a model F3-8. The older press handles plate up to $\frac{1}{4}$-inch by 13 feet and the newer machine up to $\frac{3}{16}$-inch by 11 feet.

By replacing sharp welded or riveted corners wherever possible by quickly made, smooth, round, bended ones, the Steelwelds are proving an important factor in providing the modern, sleek appearance characteristic of Seagrave fire apparatus.

GET THIS BOOK!
CATALOG No. 2002 gives complete construction and engineering details. Profusely illustrated

THE CLEVELAND CRANE & ENGINEERING CO.
1115 EAST 283RD ST. WICKLIFFE, OHIO.

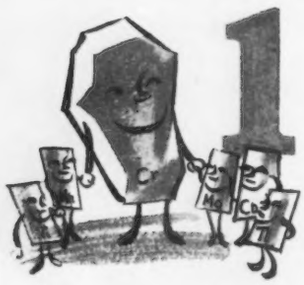
CLEVELAND
STEELWELD PRESSES
GENERAL SALES AGENTS: THE CYRIL BATH CO., E. 70TH & MACHINERY AVE., CLEVELAND

We found a way
to out-fox the Axis
WHEN THEY CORNERED
SWEDISH SPRING STEEL
THINGS looked serious when Hitler shut off shipments of steel from Sweden. Valve springs—so all-important to the efficiency of automotive engines—were made largely from Swedish steel wire rods. Manufacturers swore by the Swedish product—thought nothing could take its place.
Faced with this situation, our metallurgical experts went to work and developed a domestic valve spring steel not only equal to the finest Swedish product, but *better.* Today our plants are making huge tonnages of this steel by the Open Hearth process, employing closely controlled heat treatments and newly developed wire-making practices. The Axis has been out-foxed again—they failed to put a crimp in America's automotive production.
Valve springs made from this domestic steel are giving superb service in the hard-working motors of American trucks, tanks and jeeps. Even in the stepped-up requirements of war service they are doing an outstanding job.
Production of this superior valve spring steel was no lucky happenstance. It was possible because of our long experience, as America's largest wire makers, in making high grade steels.
This wire-making "know-how" has helped solve one tough war problem after another. From this unequalled background and the accelerated progress of these war years, will come new and finer products to serve you in the coming years of peace.
AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
United States Steel Export Company, New York
Wire for War Products
COLD FINISHED STEEL BARS · COLD ROLLED
STRIP STEEL · MANUFACTURERS' WIRES
STAINLESS STEEL · SPRING WIRE
WELDING WIRE · WIRE SPRINGS
UNITED STATES STEEL

Basic Facts about

STAINLESS STEELS

A STAINLESS STEEL PRIMER



STAINLESS STEELS

are corrosion-resistant steels containing at least 12 per cent chromium with or without other alloying elements, such as nickel, manganese, molybdenum, columbium or titanium. They are supplied in a wide range of analyses.

The stainless steels vary in corrosion resistance, workability, wear resistance, and physical properties according to the amount of chromium, carbon and other modifying elements present.

VALUABLE PROPERTIES INCLUDE:

Good corrosion and oxidation resistance . . . varying almost in direct proportion to the amount of chromium present.

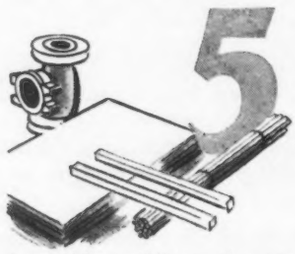
High strength-weight ratio in some cold-rolled types permitting fabrication of strong, light-weight trains, aircraft, and other structures.

MAINTENANCE

of stainless steels is simple. Washing with soap, water, and a cleanser recommended for stainless steel will keep the surface bright and free from surface deposits.

FABRICATION

is accomplished by almost all common methods. They can be machined, spun, deep-drawn, forged, punched, stamped, and otherwise mechanically-worked. They can be welded by all the common welding methods. If the austenitic steels are stabilized with columbium or titanium, and columbium-bearing welding rod is used, no annealing is necessary after welding.



MANY FORMS

are available in the common analyses including sheet, plate, strip, tubing — both seamless and welded — bars, wire, cable, welding rod, and a variety of cold-rolled shapes. Stainless steel is also supplied as foundry castings.

APPLICATIONS

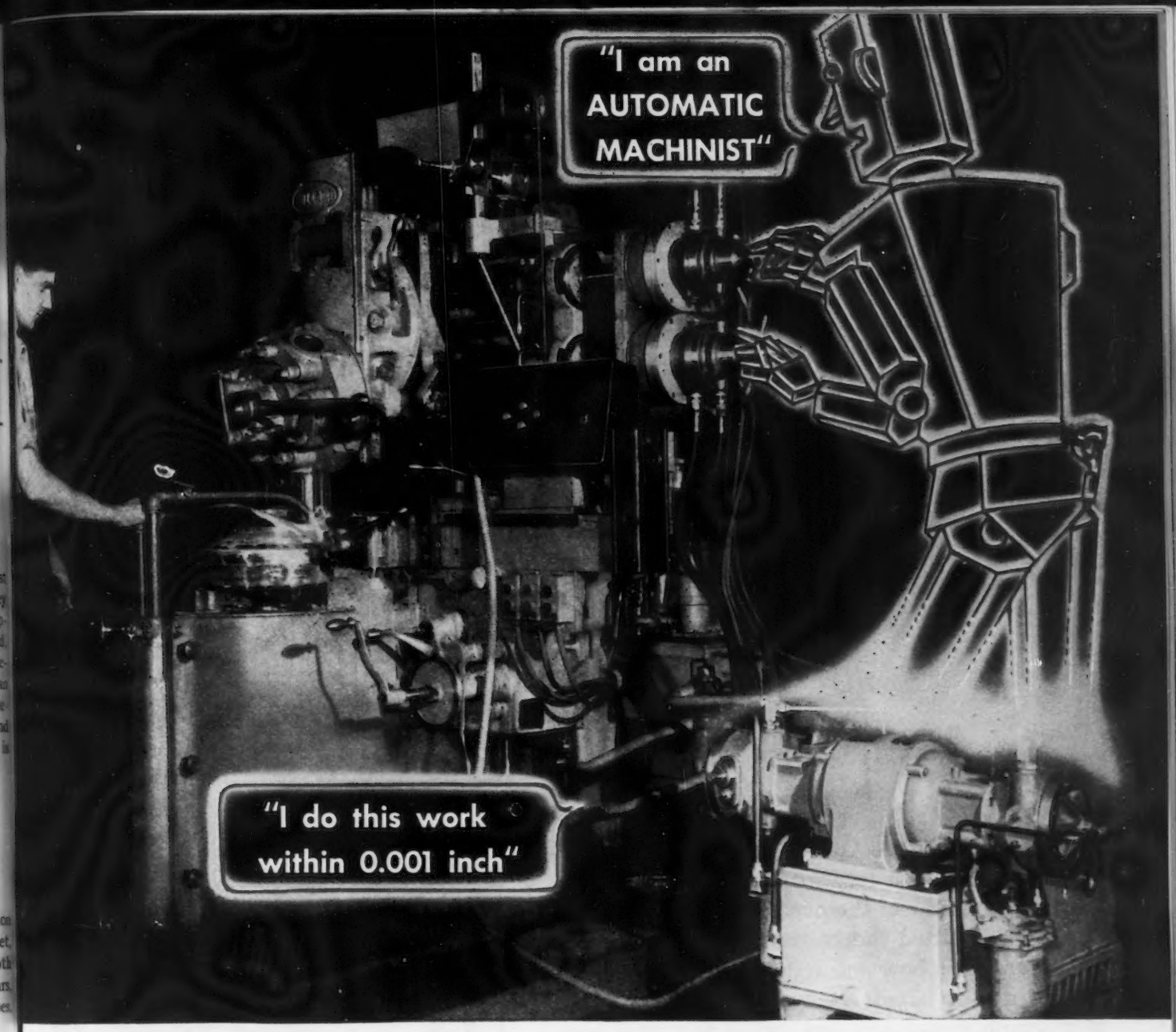
of stainless steel are numerous. Because of their resistance to corrosion and oxidation, as well as their high strength and bright surface, stainless steels have been used in hospitals, chemical plants, oil refineries, railroad trains, aviation equipment, and power plants. In the present emergency, they are available only for those industries participating in war production.

• • •

Although we do not make steel, we have for more than 35 years produced "Electromet" ferro-alloys and metals used in making steel. With the knowledge accumulated from this experience, we are in a position to give impartial advice. If you have a specific problem concerning the manufacture, fabrication, or use of stainless or other alloy steels, consult us without obligation.

Electromet
Trade Mark
Ferro-Alloys & Metals

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N.Y.
In Canada, Electro Metallurgical Company of Canada, Limited, Welland, Ontario.



Get this *AUTOMATIC,* ERROR-PROOF OPERATOR and get 7 TIMES MORE PRODUCTION from *your present standard* tool room tools.

A DUPLIMATIC will automatically turn one, or two, or three feed screws of almost any machine tool, automatically, simultaneously! It will permit almost any standard machine tool to be converted over to mass production contour machining at accuracies that will astonish you.

It is uncannily human, yet it operates with absolute certainty.

No human operator could possibly turn the two feeds on this vertical lathe to form-turn this ordnance part at required speeds of production and at the limits demanded. Yet DUPLIMATIC does it easily, accurately and at speeds that exceed the original specification.

DUPLIMATIC "FITS" ANY MACHINE

DUPLIMATIC Single, Dual or the three dimensional "Special"—can be quickly connected up with any standard tool room tool. A few hours to connect the drive heads to the feed screws; a few more to show the operator how simple DUPLIMATIC is to handle and *mass production at tool room limits has started!* An average of 7 times more production than with manual operation alone is the well-established record of DUPLIMATIC.

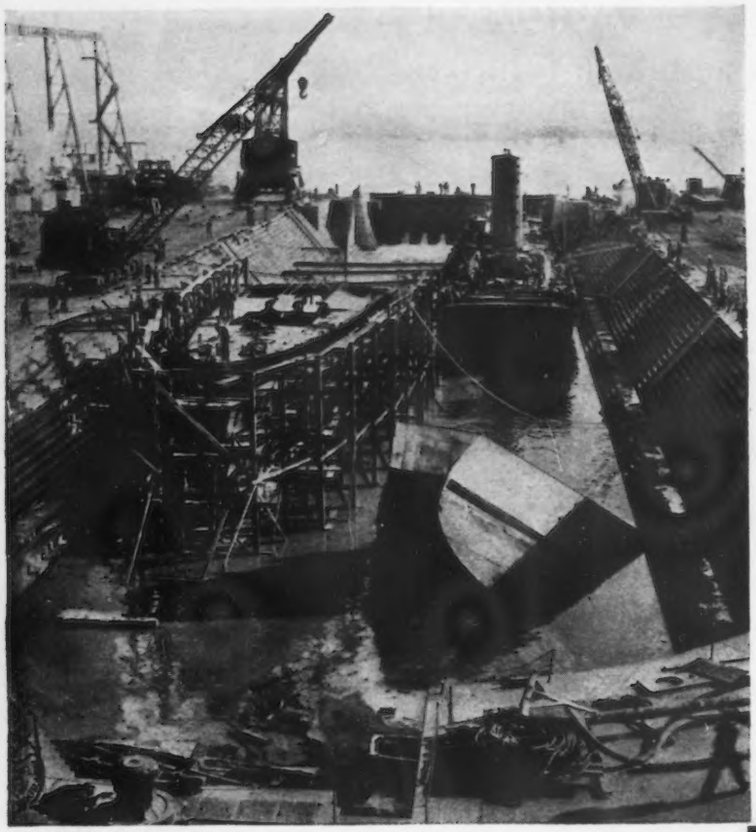
WHO USES DUPLIMATIC? The biggest producers of war goods use DUPLIMATIC: Pontiac, Cadillac, Chevrolet, Chrysler, DeSoto, Pullman and Pressed Steel Car, A. O. Smith—to mention just a few.

When your Pet Machinist gets drafted . . .
draft DUPLIMATIC

DUPLIMATIC
and your present tool room tools will do more contour machining faster, more accurately and with less skilled help.

DETROIT UNIVERSAL DUPLICATOR CO.

730 E. Milwaukee Ave. Detroit, Michigan



Official U.S. Navy Photo

WAR *hits 'em hard!*

★

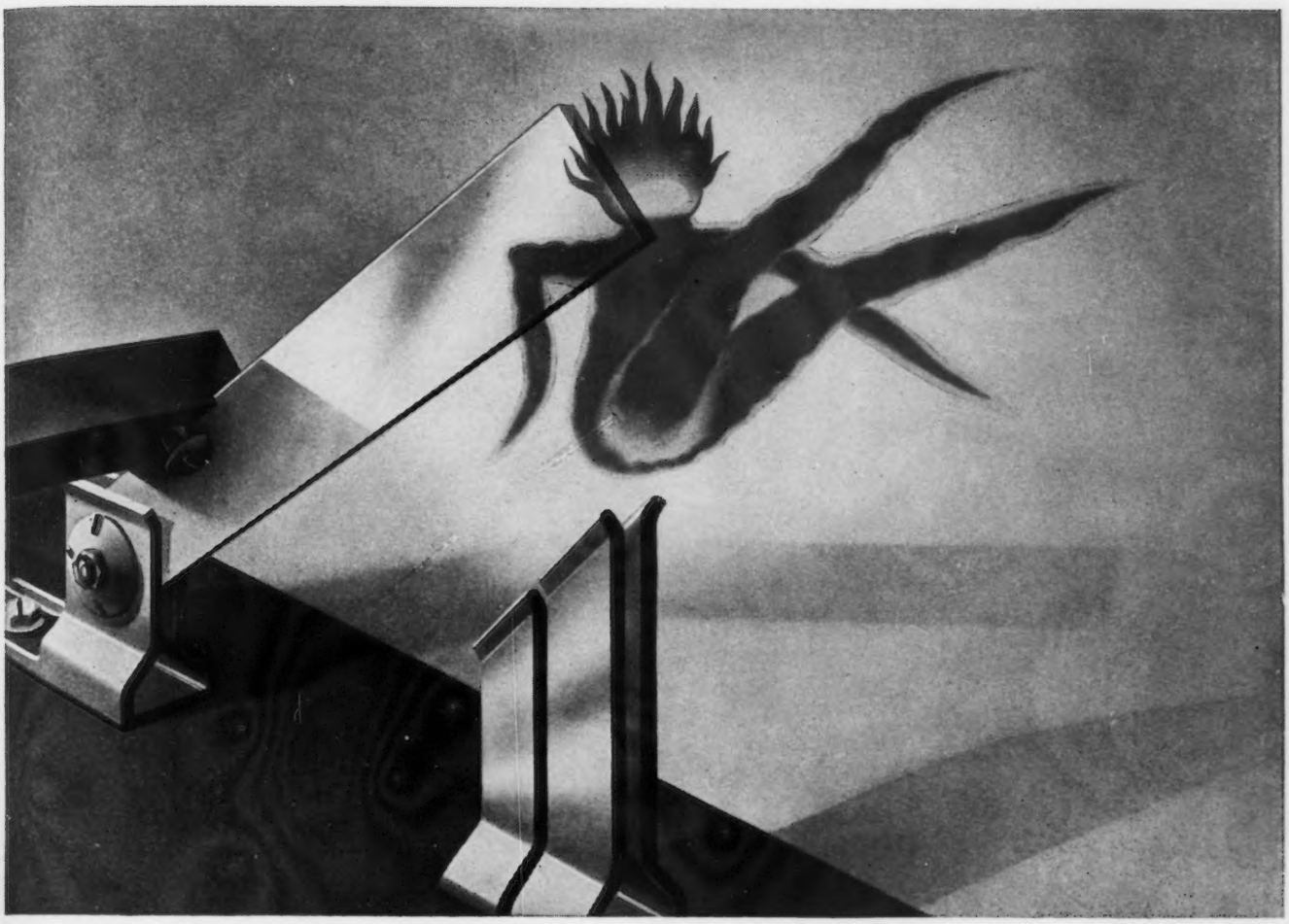
machine tools, like ships, need time out for repairs

At Pearl Harbor the U.S.S. Shaw suffered a destructive hit on her forward section. Bombs blew off the entire bow of the destroyer. But the determined Navy fitted the battle-scarred ship with a temporary false bow and sailed her across the Pacific to a West Coast Navy Yard, where, as the photograph shows, she was joined to a new bow. "Good as new," the Shaw has long since returned to battle. ★ Battles today start on production lines. Machine tools are weapons of production. This war hits 'em hard! They take more punishment in a single year of intensive, day-and-night shifts than in a decade of normal production. They, too, must be speedily and efficiently rebuilt when they break down. ★ Simmons has restored many hundreds of worn-out, damaged machine tools to perfect working condition. This company has the experience and facilities to solve your rebuilding problem quickly. Ask for full details on "The Simmons Way." Simmons Machine Tool Corporation, 1721 N. Broadway, Albany, N. Y.

ARMY (E) NAVY

SIMMONS *Engineered* MACHINE TOOL REBUILDING

See Our Listings on Page 186



hot arcs get the point Quick!

Arcs burn with terrific heat when they leap between opening contacts. The heavier the load... the hotter they burn. Switch contacts get badly pitted and burnt, unless the arc is both controlled and extinguished, *quick*.

Westinghouse Safety Switches eliminate this source of trouble. The diamond-pointed jaw carries the arc outside the contact area assuring long contact life.

On Safety Switches, 575 and 600 volts, Westinghouse adds another protective plus—the "De-ion" arc quencher. This exclusive feature draws the arc up into the grids—divides and extinguishes it in the blink of an eye.

These advantages mean better, more dependable protection. Contacts stay clean, last longer. Time-outs for maintenance and inspection reduced.

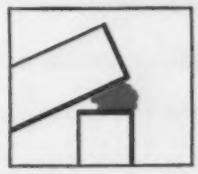
Protect your important circuits with Westinghouse Safety Switches. Ratings up to 1200 amps, 600 volts. Call your Westinghouse representative today. Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa., Dept. 7-N.

J-21266

LIKE THIS

Diamond-pointed break jaws confine arcing to the point... force the arc to break outside the current carrying areas. Contact surfaces stay clean, don't pit and burn.

NOT LIKE THIS



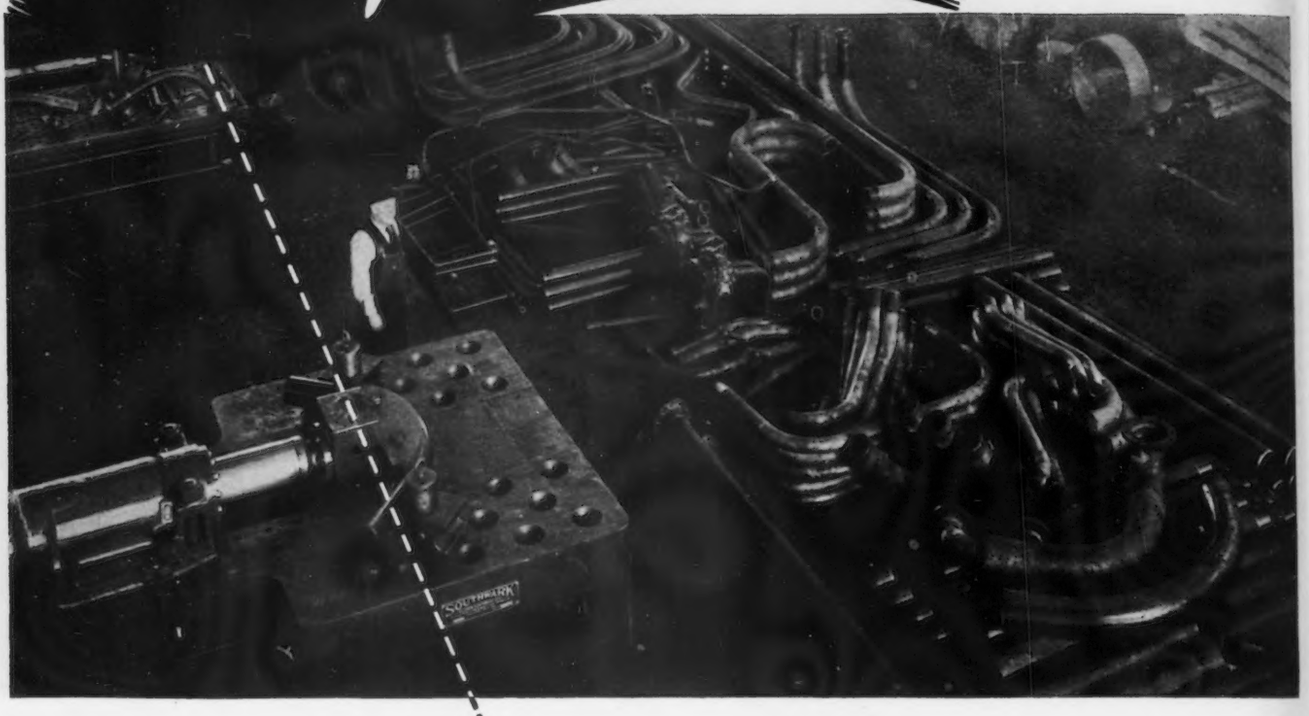
When ordinary safety switches are opened, the arc leaps across the contact areas . . . along the jaw and blade. It hangs on longer, burns and pits the contact surfaces.

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

SAFETY SWITCHES

for Pipe Bending



Southwark Hydraulic Presses

Most bends can be made cold on this powerful 200-ton Southwark hydraulic pipe bending press. Time required for heating the pipe is saved and distortion of bend due to cooling shrinkage is eliminated.

Self-contained, this oil operated Southwark hydraulic press is under perfect control of the operator at all times—a feature particularly valuable during difficult bends. Southwark pipe bending presses are time and money savers.

Southwark builds a complete line of shipbuilding machinery including bending rolls, plate planers, keel benders, sectional flanging presses and joggling presses. New designs in these hydraulic presses and power tools are helping shipbuilders do a better job faster. Write for Bulletin K-160 which illustrates many of these products.

Baldwin Southwark Division, The Baldwin Locomotive Works, Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Francisco, California.

BLW THE BALDWIN GROUP **BALDWIN SOUTHWARK**

Division **THE BALDWIN LOCOMOTIVE WORKS,** *Philadelphia, Pa.*

Experience

IS A VALUABLE GUIDE

Sealing shafts within and protruding from mechanisms against the loss of lubricant and the entrance of grit and moisture, is a basic problem for the designer of any mechanism. The automotive industry solved that problem by adopting the self-contained spring loaded seal. This seal is used on all commercial American cars and trucks because it successfully meets all engineering requirements. It is the best there is today.

Chicago Rawhide has been manufacturing this type of seal since 1928, and packings for grease, air and fluid sealing since 1878. Chicago Rawhide engineers are authorities on sealing practice. Their wide experience can save much valuable time today for the designer faced with sealing problems involving war products.

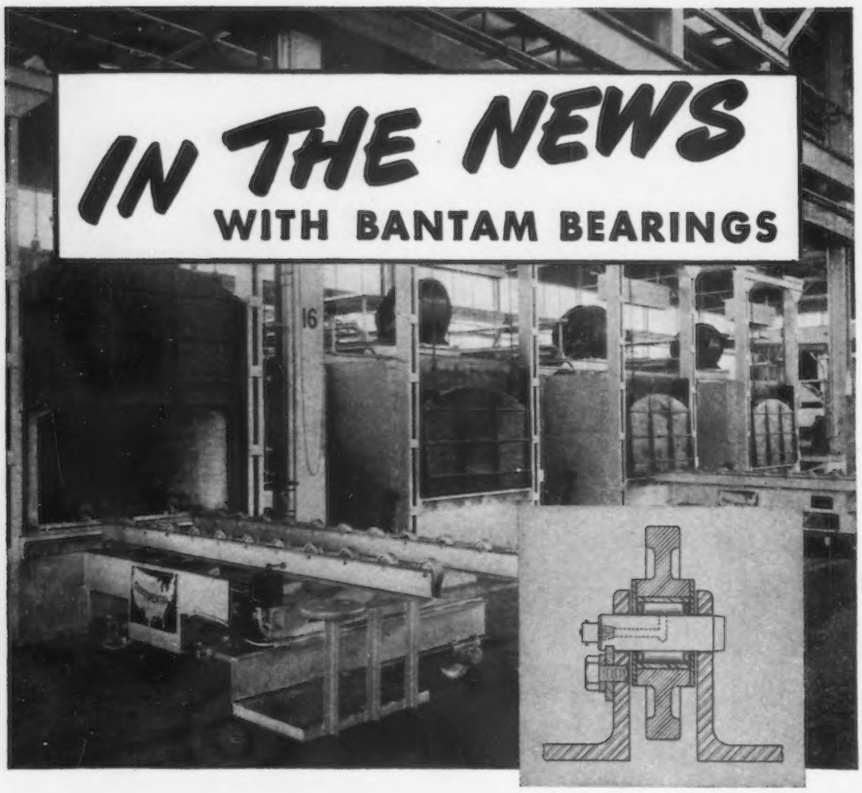
CHICAGO RAWHIDE MANUFACTURING COMPANY

1306 ELSTON AVENUE • CHICAGO, ILLINOIS

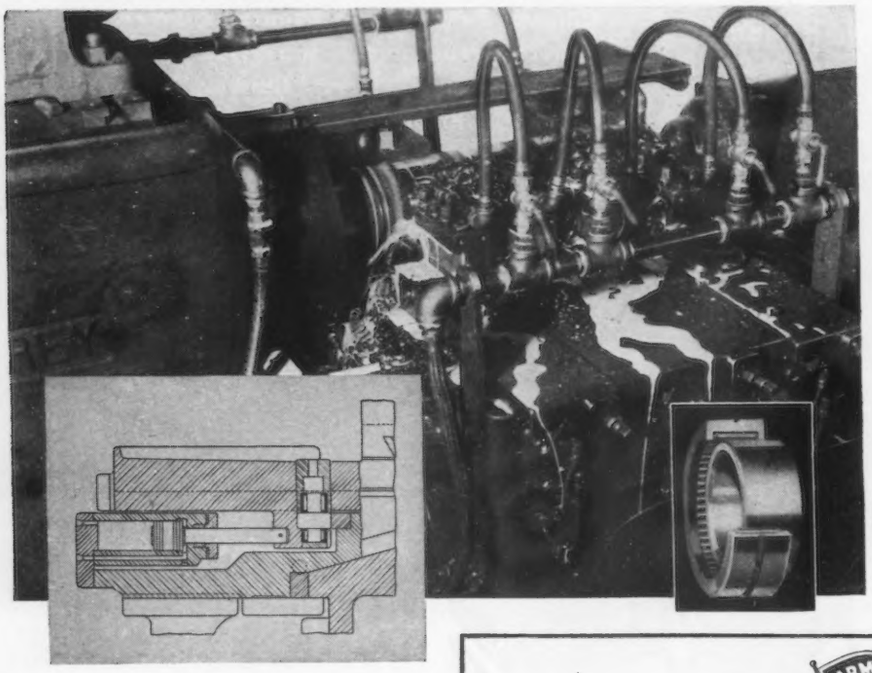
64 Years Manufacturing Quality Mechanical Leather Goods Exclusively and now Sirvene Synthetic Products

PHILADELPHIA • CLEVELAND • NEW YORK • DETROIT • BOSTON • PITTSBURGH • CINCINNATI

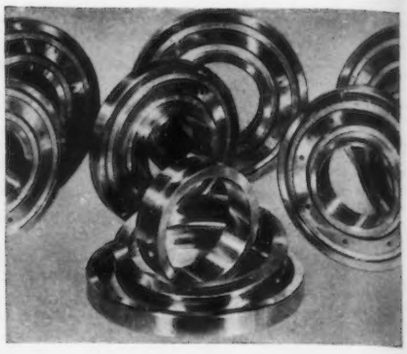
IN THE NEWS
WITH BANTAM BEARINGS



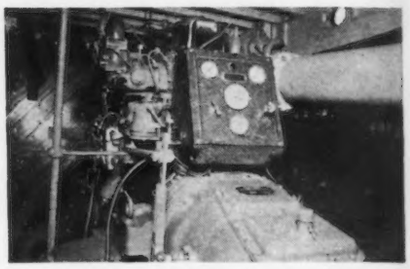
TO SPEED THE ANNEALING of iron alloys, these furnaces built by Continental Industrial Engineers, Inc., are designed for rapid handling of the work. Metal to be heat treated glides smoothly into the furnace on easy-turning rollers. As shown in cross-section, each roller turns on an anti-friction bearing unit assembled from Bantam Needle Rollers. A hardened sleeve, also furnished by Bantam, forms the outer raceway.



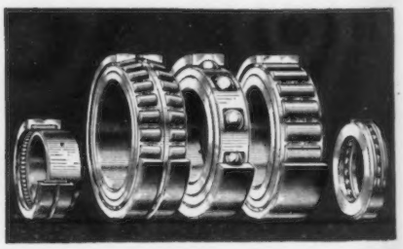
IN MACHINE TOOLS, the Quill Bearing's small size, high capacity, low friction coefficient, and efficient lubrication make it possible to combine long life, low power consumption, and compact product design. A typical instance is the use of Quill Bearings on the front carriage assembly of Semi-Automatic Shell Lathes built by Morey Machinery Co., Inc. For further details on this unusual anti-friction bearing unit, write for Bulletin M-104.



DESIGN OF SPECIAL BEARINGS is an important aspect of Bantam's service in meeting unusual requirements. These triple-race radial ball bearings were designed to eliminate starting friction in dynamometers, where this variable factor would seriously affect the accuracy of the test results. Very close dimensional tolerances were maintained in these bearings as an added assurance of accurate results.



IN MARINE APPLICATIONS TOO, Bantam Bearings play their part in improving product performance. Twin Disc Clutch Company uses Bantam Bearings for the throwout bearing on its widely used Marine Reverse and Reduction Gears, one of which is shown here on a 215-HP engine.



WHEN LARGE-SIZE BEARINGS ARE NEEDED, Bantam's experience in the design and manufacture of heavy-duty bearings is of special value. Bantam's line includes every major type of anti-friction bearing—in sizes up to the largest ever built. If you have a problem involving exceptionally severe bearing requirements, TURN TO BANTAM.

ARMY E NAVY

BANTAM BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

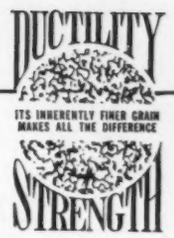
BANTAM BEARINGS CORPORATION · SOUTH BEND · INDIANA

SUBSIDIARY OF THE TORRINGTON COMPANY · TORRINGTON, CONN.

You can cold draw

N-A-X
High Tensile

easily



it's the low alloy steel
with exceptional ductility

Cold forming a product out of N-A-X HIGH TENSILE is no problem, because this low alloy, high tensile steel has the ductility necessary for successful cold forming and drawing. It is truly a remarkable high tensile steel, in that it combines the cold forming properties of mild carbon steel with the valuable qualities of high tensile steel.

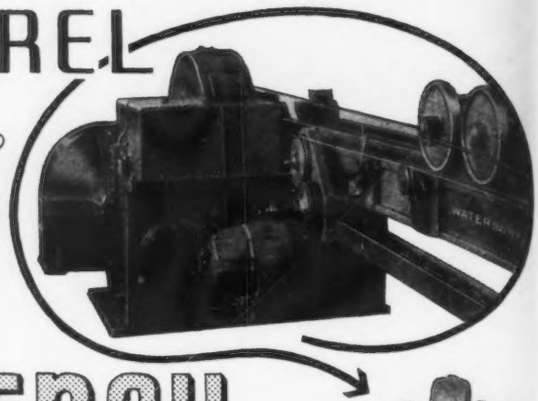
Of major importance to users of high tensile steel is the unusually high resistance N-A-X HIGH TENSILE has to *impact* and *fatigue*, at normal as well as at sub-zero temperatures. This means that parts and products made of N-A-X HIGH TENSILE have the stamina to stay on the job, regardless of tough usage.

Great Lakes engineers are available to show you how you can use this really superior high tensile, low alloy steel to advantage. One will be glad to call at your plant, give you the benefit of wide experience in the use of N-A-X HIGH TENSILE in hundreds of exacting applications. No obligation. Write, telephone or wire for one today.

GREAT LAKES STEEL CORPORATION · DETROIT, MICH. NATIONAL STEEL *Sales Offices in Principal Cities*

Division of NATIONAL STEEL CORPORATION Executive Offices, Pittsburgh, Pa.

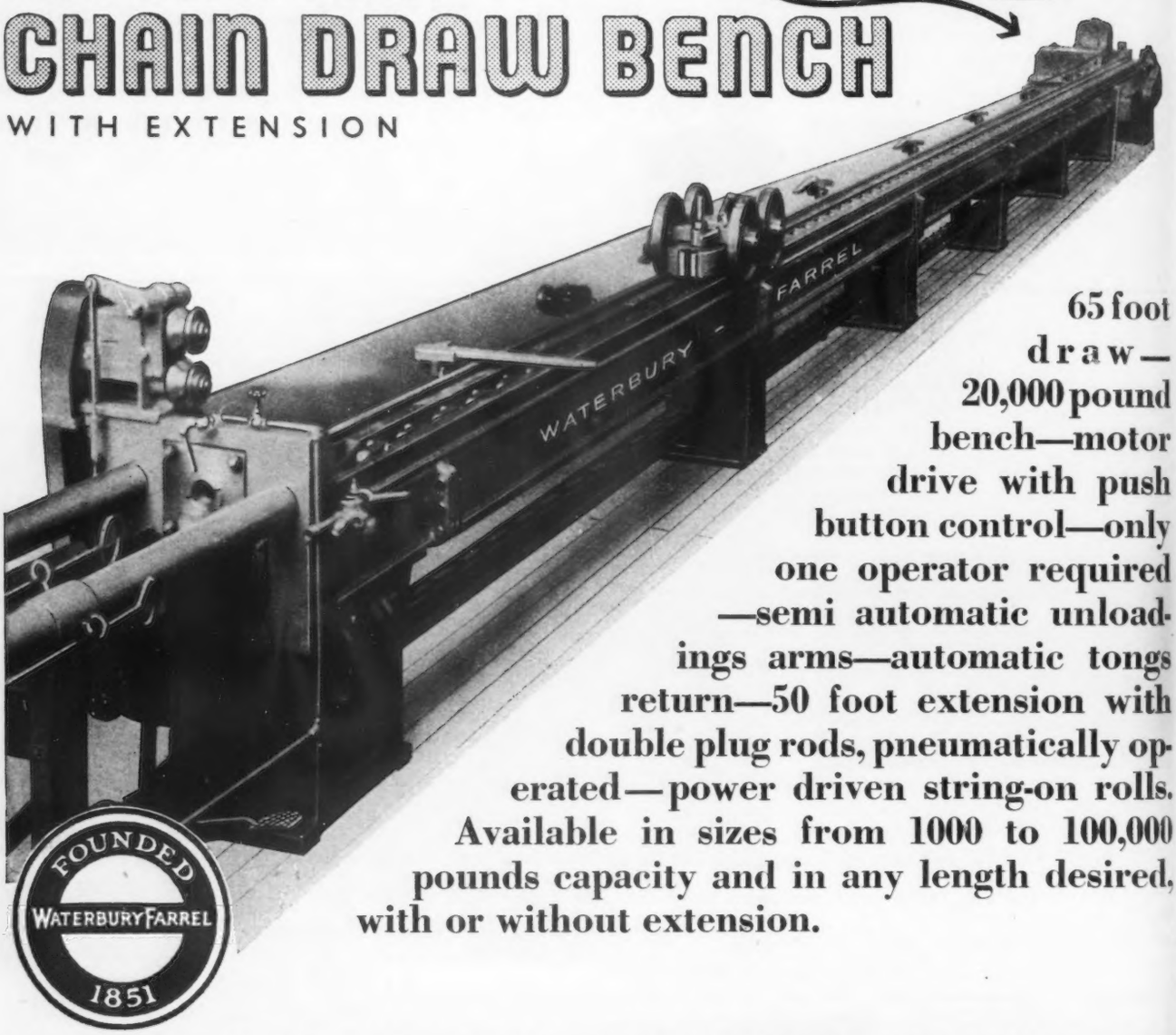
ANOTHER MEMBER *of the* WATERBURY-FARREL *Line*



The MOTOR DRIVEN

CHAIN DRAW BENCH

WITH EXTENSION



65 foot draw—20,000 pound bench—motor drive with push button control—only one operator required—semi automatic unloadings arms—automatic tongs return—50 foot extension with double plug rods, pneumatically operated—power driven string-on rolls. Available in sizes from 1000 to 100,000 pounds capacity and in any length desired, with or without extension.

FOUNDED WATERBURY FARREL 1851

MACHINERY FOR FLAT METAL, SHAPES, RODS, TUBES AND WIRE

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY • CONNECTICUT • U·S·A

Ol' Red Wabbler says:

You can get a premium metal at a standard price . . .

WHY PAY MORE ? ? ? ? ?

Mackintosh-Hemphill Techniron for castings is a premium cast iron of a close grain which is uniform throughout variable sections of the casting. It machines readily, easily. The finished castings are strong, having high resistance to shock.

M-H Techniron castings are being used for planers, lathes, rams, and many other precision machine parts.

When you need heavy iron castings specify M-H Techniron. You'll get premium metal at a standard price.

MACKINTOSH-HEMPHILL COMPANY

PITTSBURGH AND MIDLAND, PENNA

M-H TECHNIRON for castings

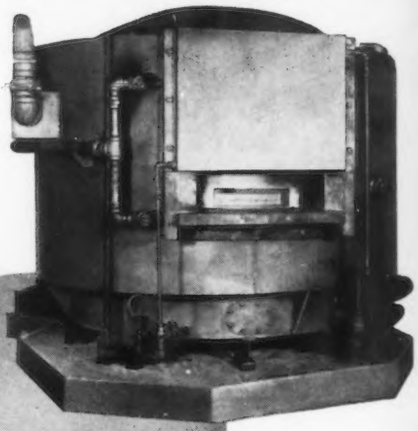
where exceptional quality

is essential

Other Mackintosh-Hemphill Products:

Rolling Machinery . . . Shape Straighteners . . . Strip Coilers . . . Shears . . . Levellers . . . Pinions . . . Special Equipment . . . Iron-Steel Castings . . . The NEW Abramsen Straightener . . . Improved Johnston Patented Corrugated Cinder Pots and Supports . . . Heavy Duty Engine Lathes.

B&W INSULATING FIREBRICK



STEP UP PRODUCTION
SAVE FUEL

SHORTER HEATING-UP TIME

GREATER FURNACE OUTPUT

MORE UNIFORM TEMPERATURE

FEWER REJECTS

LESS FUEL CONSUMPTION

B&W Insulating Firebrick make these results possible because of their light weight. In each of their temperature ranges they are the lightest that can be made by modern manufacturing methods. Therefore B&W Firebrick have these inherent characteristics: lowest heat-conductivity and lowest heat-storage-capacity.

BABCOCK & WILCOX

THE BABCOCK & WILCOX COMPANY
REFRACTORIES DIVISION
85 LIBERTY STREET, NEW YORK, N. Y.

R-159

With the **LANDIS** *Chaser – Thread Quality is Assured by the Variable* **RAKE ANGLE**

RAKE ANGLE RANGE COVERS ALL MACHINABLE MATERIALS

The rake of the Landis chaser is variable, ranging from 5° negative to 35° positive.

This variable rake permits the use of the suitable cutting angle for each machinable material and assures the production of cleanly cut and correctly formed threads.

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

OUR JOB

BETTER ROLLS FOR GREATER PRODUCTION

Rolling Mills depend upon Phoenix Rolls to fulfill a definite and very important part in the war program with unflagging perseverance. This confidence is indeed warranted by the performance of these rolls under unusual operating conditions.

PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of
BLAW-KNOX CO.—"Steel's Partner" • PITTSBURGH, PA.

These refractories can help you

KEEP UP THE PRODUCTION PACE

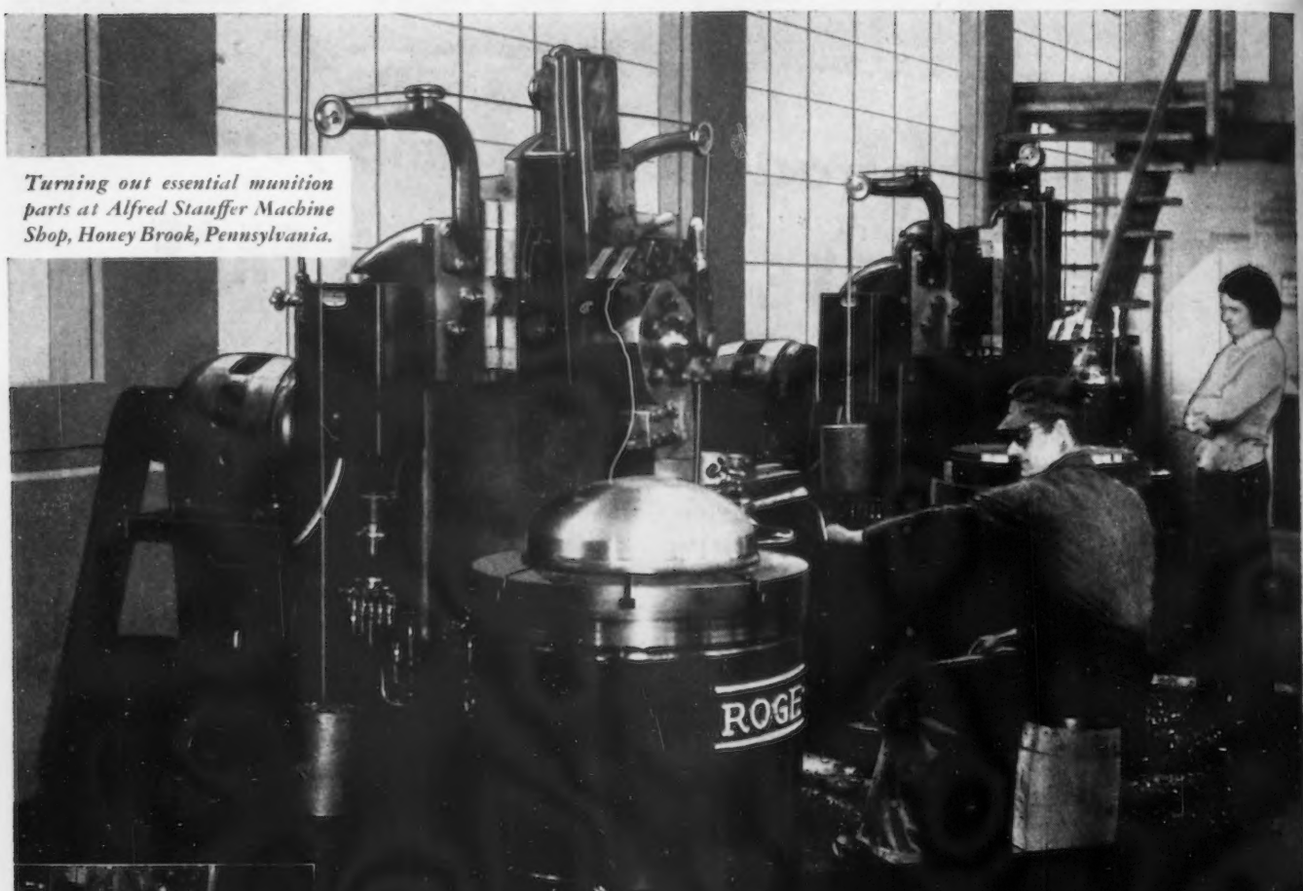
WITH speedy production the key to America's victory, furnaces all over the country are being pushed at a terrific pace. And Armstrong's Insulating Fire Brick are helping many furnaces, such as the slab heater shown below, to stand up under this service strain. These brick have the stamina to keep furnaces in service longer, with less time out for repairs.

Armstrong's Brick can help *you* turn out tonnage *faster* and *cheaper!* They hold heat under accurate control in the temperature range you want—they help save fuel—and they lower maintenance time and expenses.

There are five types of Armstrong's Insulating Fire Brick. (For temperatures from 1600° to 2600° F.) All have high insulating efficiency that helps insure uniform, high-quality production. And these brick, though light in weight, have exceptional crushing strength, resist spalling, and have ample refractoriness for the use intended. They heat and cool quickly.

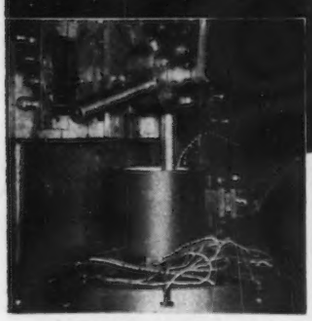
Armstrong's engineers will be glad to help you select the right brick for your furnace application. For complete information and technical data, write Armstrong Cork Company, Insulating Refractories Department 4903 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INSULATING REFRACTORIES



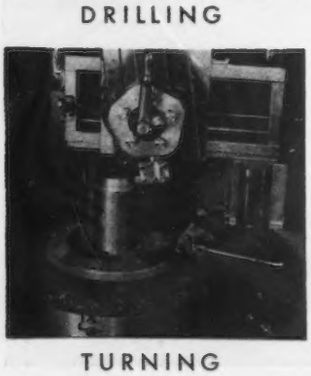
Turning out essential munition parts at Alfred Stauffer Machine Shop, Honey Brook, Pennsylvania.

ROGERS "Perfect 36" VERTICAL TURRET MILLS *in action*



BORING

DRILLING



TURNING

● Modern design and universal adaptability have won a place for Rogers "Perfect 36" Vertical Turret Mills in war production throughout the United Nations.

Quicker set-ups . . . more finished work per hour per mill . . . and closer tolerances are the direct results of level chuck and *adjustable main and special swivel side heads.*

Remember, Rogers Vertical Turret Mills will be as versatile in tomorrow's peace-time production as they are today in turning out urgent war production.

Call on Rogers today or tomorrow.

QUICK DELIVERY AT SURPRISINGLY LOW PRICES

ROGERS MACHINE WORKS, INC.

Sales Offices: 131 ARTHUR ST., BUFFALO, N. Y.

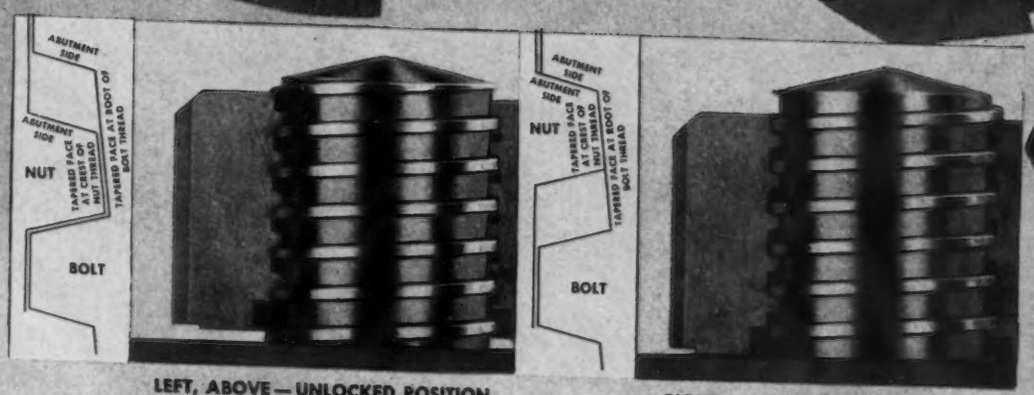
Factory: ALFRED, N. Y.

KNOWING HOW SINCE 1885

JUST A MAN, A MAUL AND A WRENCH WITH A *Dardelet* RIVET-BOLT

UNITED STATES STEEL SUPPLY CO.
subsidiary of United States Steel Corporation,
one of the distributors of Lamson-made Dardelet products, maintains warehouse stocks at

Baltimore, Md. Newark, N. J. St. Louis, Mo.
St. Paul, Minn. Chicago, Ill. Pittsburgh, Pa.
Allston, Mass. and Cleveland, Ohio



LEFT, ABOVE—UNLOCKED POSITION

RIGHT, ABOVE—LOCKED POSITION

● No air compressors. No forge for heating rivets. No pneumatic hammers. No five or seven man crew. Just a man and a maul and wrench can apply Dardelet *RIVET-BOLTS*. You can see how they are applied by observing their appearance. You drive them into the punched or drilled hole, and the deep splines flatten to make a body-bound fit. Apply the nut, which spins freely on the Dardelet thread, until it seats, then apply the wrench. When the root of the Dardelet nut thread rides up on the opposing high diameter of the bolt, you have the famous Dardelet Thread-Lock. (See diagrams for understanding this action.) During a time study in the field, 5 men drove and fastened 750 ⅞-inch Dardelet *RIVET-BOLTS* in an 8 hour day, whereas, a 5 man crew installed only 300 shot-driven rivets in the same period. Construction engineers throughout the country are specifying Dardelet *RIVET-BOLTS* without hesitation for they have established the fact that their use provides a sounder construction than a hot riveted job. Specific engineering data on request—and samples too, if you want to make your own tests. Lamson & Sessions makes all types of bolts with Dardelet threads as well as *RIVET-BOLTS* and Machine Bolts for structural steel erection and assemblies. ● In present-day construction where alterations, additions and even complete dismantling may be necessary, Dardelet *RIVET-BOLT* assembly is the only efficient method providing quick solution of all three problems.

THE LAMSON & SESSIONS COMPANY • 1971 West 85th Street • Cleveland, Ohio
Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

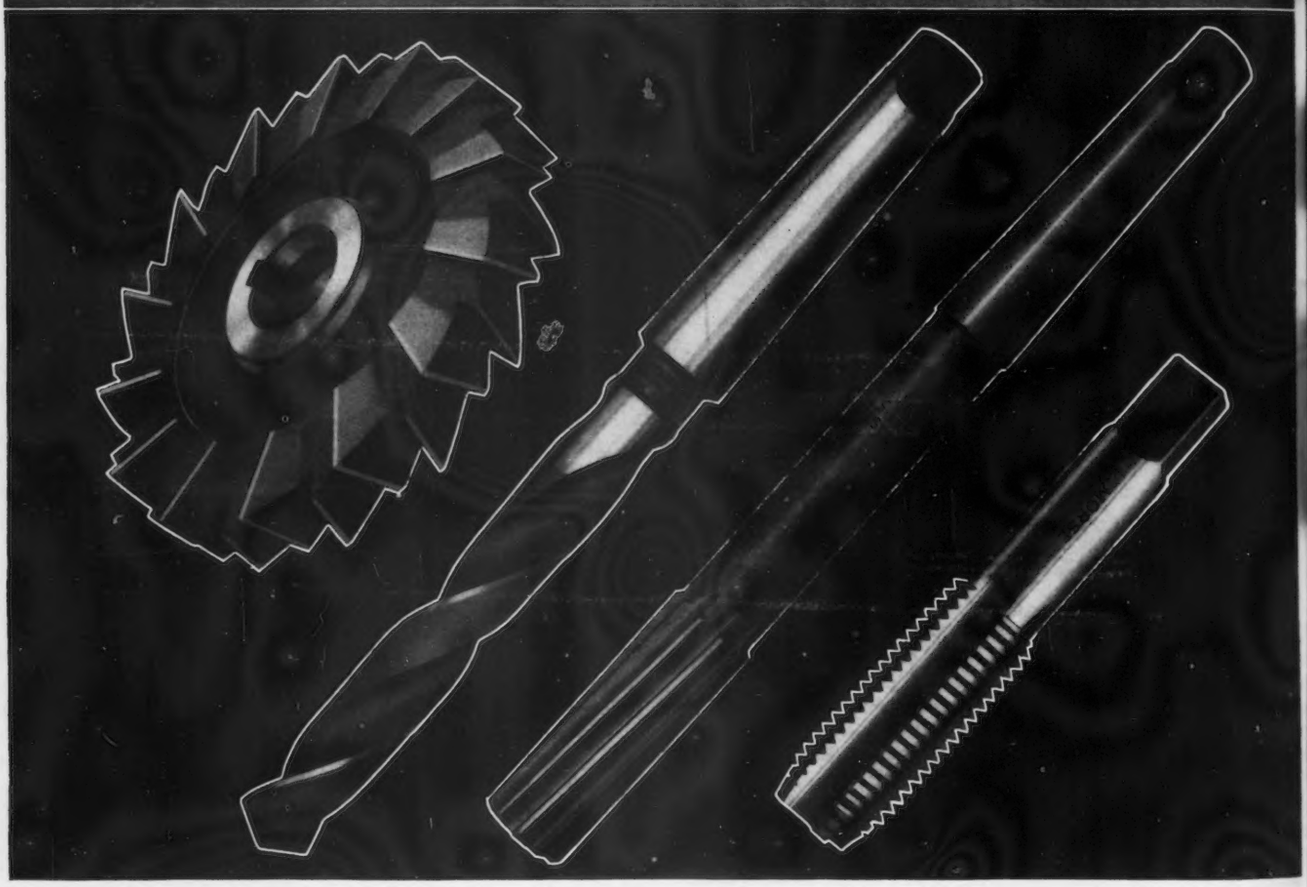
AMSON & SESSIONS

LTS · · NUTS · · COTTERS · · CAP SCREWS · · SPECIALS

Your Jobber Stocks the Lamson Line

BOOST "MACHINE MORALE"

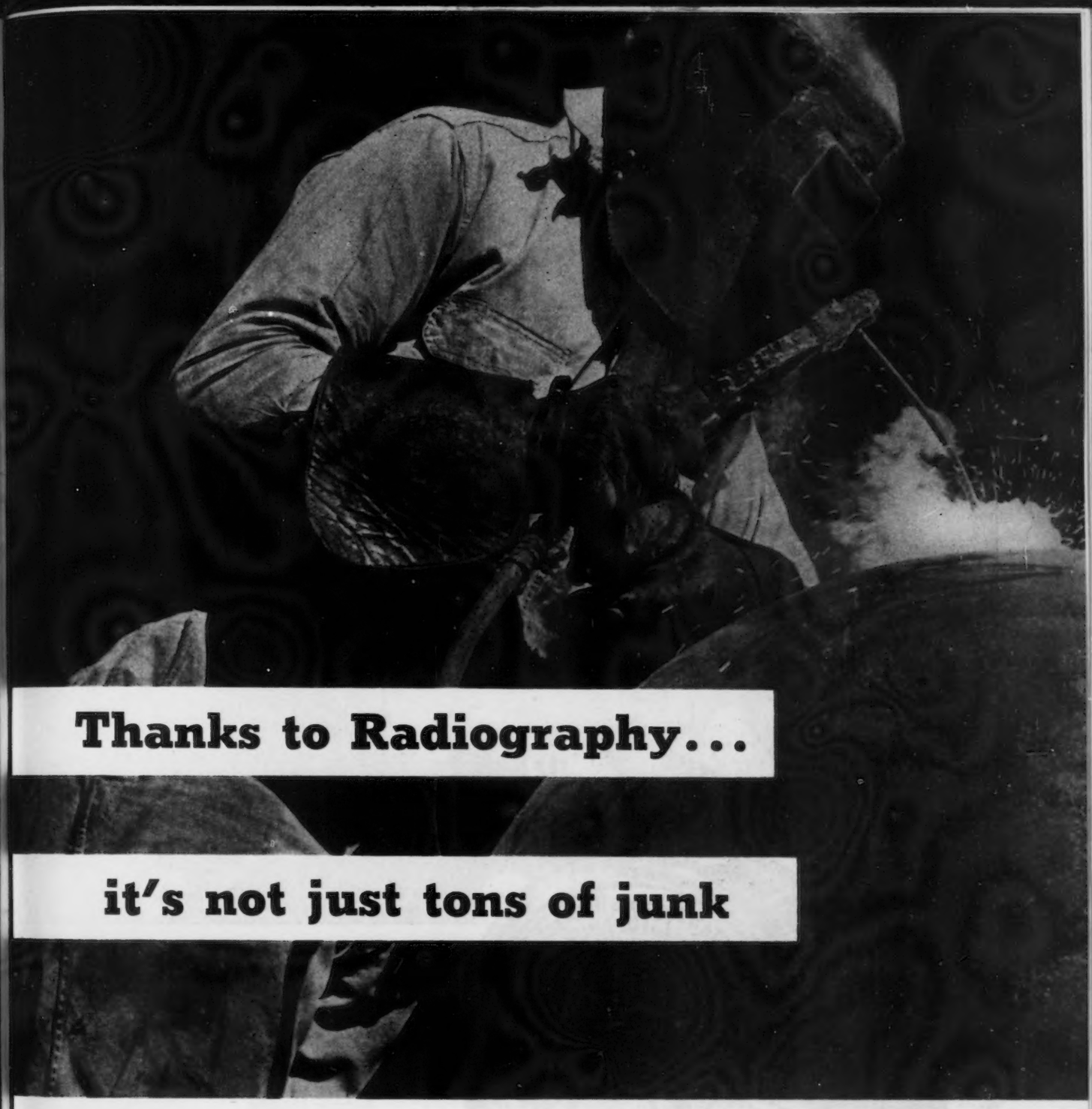
The best of machine tools become better ones — do more work, with greater precision, with fewer stops — when equipped with highest quality cutting tools.



MORSE THERE *IS* A DIFFERENCE

TWIST DRILL AND MACHINE COMPANY
NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. - - - - CHICAGO STORE: 570 WEST RANDOLPH ST.



Thanks to Radiography...

it's not just tons of junk

VISUALIZE a multi-ton casting vitally needed for a war delivery. It's ready for inspection—for the answer to the question: Is it O.K.?

First, x-ray film is placed inside the casting. Then, radiography goes to work. Penetrating rays—x-rays from an x-ray machine, or gamma rays emanating from a capsule of radium salt—go right through the inches-thick walls of casting and record the "inside story" on the x-ray film.

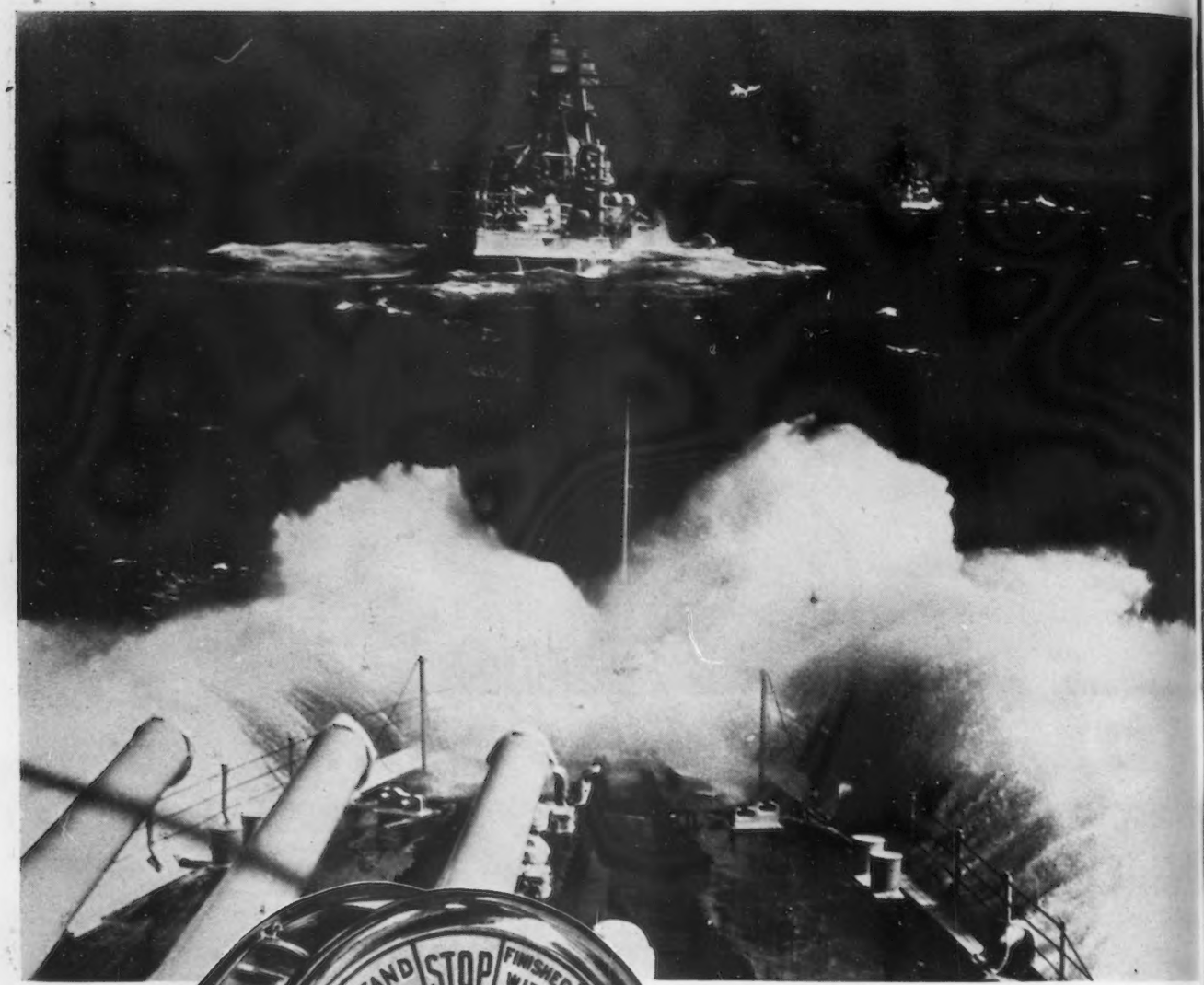
When the films are developed, a serious fault is revealed . . . 'way down deep in the metal. The giant casting is defective . . .

It can't be delivered as it is—it might fail in service. Yet, it doesn't have to be junked—with the waste of precious materials, manpower, and time that would represent—and a whole new casting made. For radiography which finds the trouble also points out the way to fix it. Because the weak spot can be "seen," it can be chipped out . . . replaced with solid metal . . . and, as checked by further radiographs, the casting made as strong as if it had been perfect originally. Now it's ready to ship.

This is an illustration of the twofold nature of radiography's job in industry today—finding trouble and also the way to remedy it. Kodak's part is to supply a line of special films, solutions, and accessories for this work . . . and to make available the experience which has been accumulated in 16 years of research in this field.

EASTMAN KODAK COMPANY

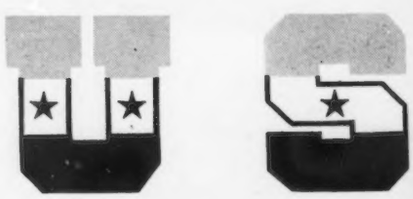
X-RAY DIVISION **ROCHESTER, N. Y.**



OFFICIAL U. S. NAVY PHOTOGRAPH

FULL SPEED AHEAD

FOR



More arms, more armed men, more munitions, more machines, more war materials, more food and supplies of every kind than this world has ever seen . . . that's the warpower we're mustering. It's a job that requires the best from all of us . . . And, we're proud to report to you that Worth production has reached an all-time high, and that an increasing flow of quality Sheared Steel Plates and Flanged and Dished Heads is being delivered to the United States Navy and other users, war-important.

WORTH

WORTH STEEL COMPANY

CLAYMONT, DELAWARE

... I do mean "And Engineering"!

It is not enough, we think, to build top quality motors; rugged and smooth-running motors; motors of advanced design with unique protective features and low-maintenance advantages. This we do.

But, our job is not done until we have pooled our motor-building ability and engineering experience with your intimate knowledge of the operating requirements in your plant.

FOR MOTOR-DRIVE IS MORE THAN POWER. Properly applied, motor-drive can do *many things.**

Reliance Application Engineers—production minded men with broad experience in many industries—will welcome an opportunity to help you get the right answers to the question—*"What can we make the motor do besides supply power?"*

Just phone or write the Reliance office nearest you.

***Motor-drive provides within itself a means of:**

Speed Control	**Reversing**
Braking	**Remote Control**
Tandem Operation	**Controlled Acceleration**
Tension Control	**Safety**

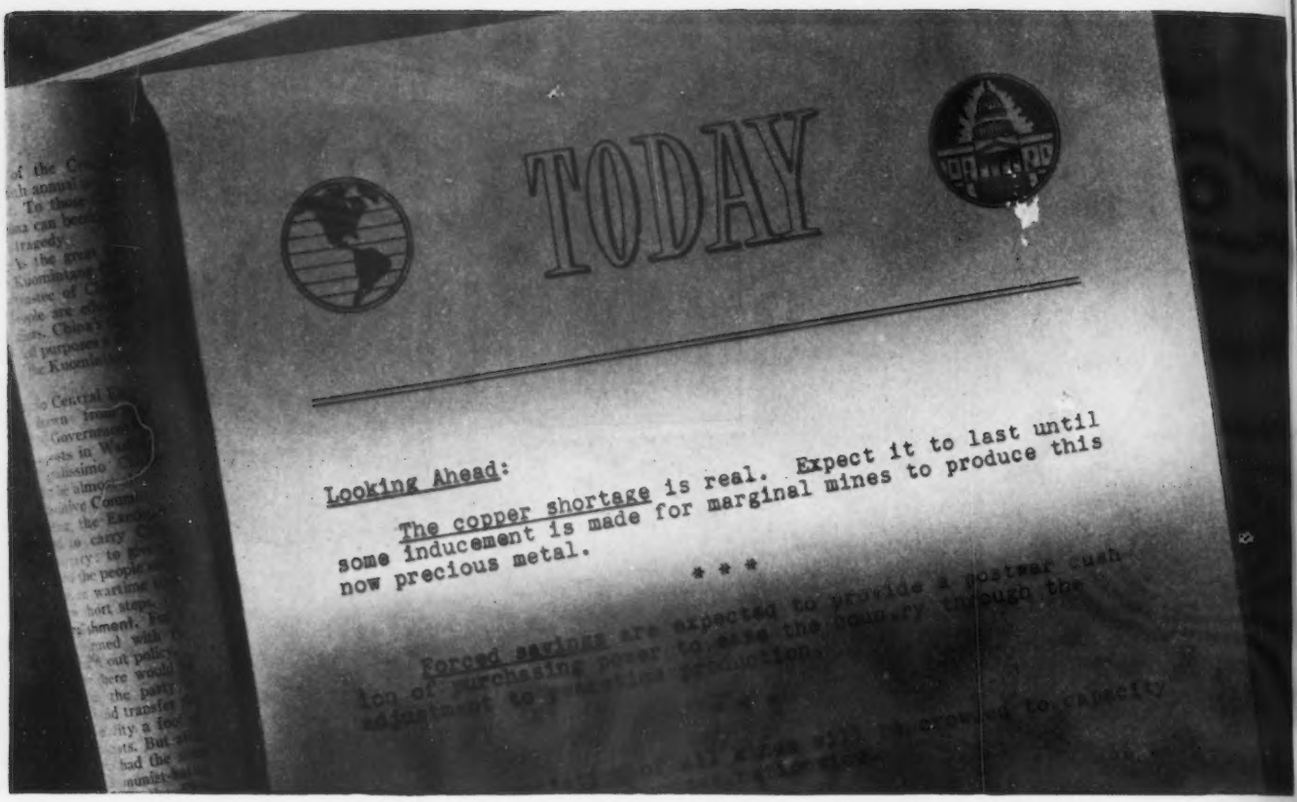
Slow Speeds for inching, threading, inspection

Applying them to boost production and improve quality is APPLICATION ENGINEERING. That's our business.

RELIANCE A-C D-C MOTORS

RELIANCE ELECTRIC & ENGINEERING CO.
1088 Ivanhoe Road, Cleveland, Ohio

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • DETROIT • GREENVILLE, S. C. • HOUSTON, TEX. • LOS ANGELES • MINNEAPOLIS
NEW YORK • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • SAN FRANCISCO • SYRACUSE, N. Y. • AND OTHER PRINCIPAL CITIES


TODAY
Looking Ahead:
The copper shortage is real. Expect it to last until some inducement is made for marginal mines to produce this now precious metal.
* * *

GOULD KATHANODE'S new type connectors deliver full current load for all makes of industrial trucks

YES, copper is scarce—but that's a problem that Gould engineers have licked. The connectors on the Gould Kathanode you buy today consist of lead of heavy cross section which delivers the same high voltage and performance as copper. Admittedly not as desirable as pure copper—the important thing is, they do the job. If you need a new battery, don't let the copper shortage stop you.

But first make sure you are getting the most out of your present Gould Kathanode. Its spun glass construction introduced by Gould to American industry doubles battery life—which means that Gould Kathanode will last twice as long as ordinary batteries lacking this feature.

RATED CONSERVATIVELY...Goulds will equal or exceed in capacity any battery of comparable size and cell structure. Buy on proven performance and you'll buy Gould!

FREE HELP ON BATTERY PROBLEMS—*Your Gould Service Man will help you get full service from your present equipment, regardless of make. No charge, no obligation. Write Gould Storage Battery Corp., Depew, N.Y. Ask for FREE descriptive literature on any type of industrial installation.*

GOULD THE BATTERY PICKED BY ENGINEERS

Above: Pump liners for marine service.

Below: Special castings.

Variety of maintenance parts

SHENANGO-PENN

Centrifugal Castings

. . . an improved process for many products

BECAUSE it is an extremely flexible process, the use of centrifugal castings has multiplied many times under wartime production demands.

Wherever wheels turn, or corrosion or wearing problems exist, Shenango-Penn castings can probably be used. In marine service and the aviation industry, for example, parts formerly forged, are now cast centrifugally, and in many cases are giving better service.

Shenango-Penn castings have unusual advantages in strength and purity, and actually save production time because less machining is required on the finished product. Why not send for a copy of our new Bulletin No. 143 which describes the Shenango-Penn process and products, and gives a complete table of alloys available?

SHENANGO-PENN MOLD COMPANY

511 WEST THIRD STREET, DOVER, OHIO

Executive Offices: Pittsburgh, Pa.

ALL BRONZES · MONEL METAL · ALLOY IRONS

The WEAN ENGINEERING COMPANY, Inc. • WARREN, OHIO

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

- HEAVY PLATE LEVELLERS
- HI-SPEED SHEET AND TIN MILL SHEAR LINES
- ELECTROLYTIC & BONDERIZING TIN PLATE EQUIPMENT
- WILSON TUBE ANNEALING FURNACES
- WEAN VACUUM CUP SHEET AND PLATE LIFTERS
- CONTINUOUS STRIP PICKLING, SLITTING, SIDE TRIMMING, AND RECOILING LINES

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THE BRODEN CONSTRUCTION CO.
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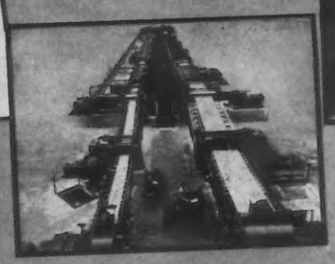
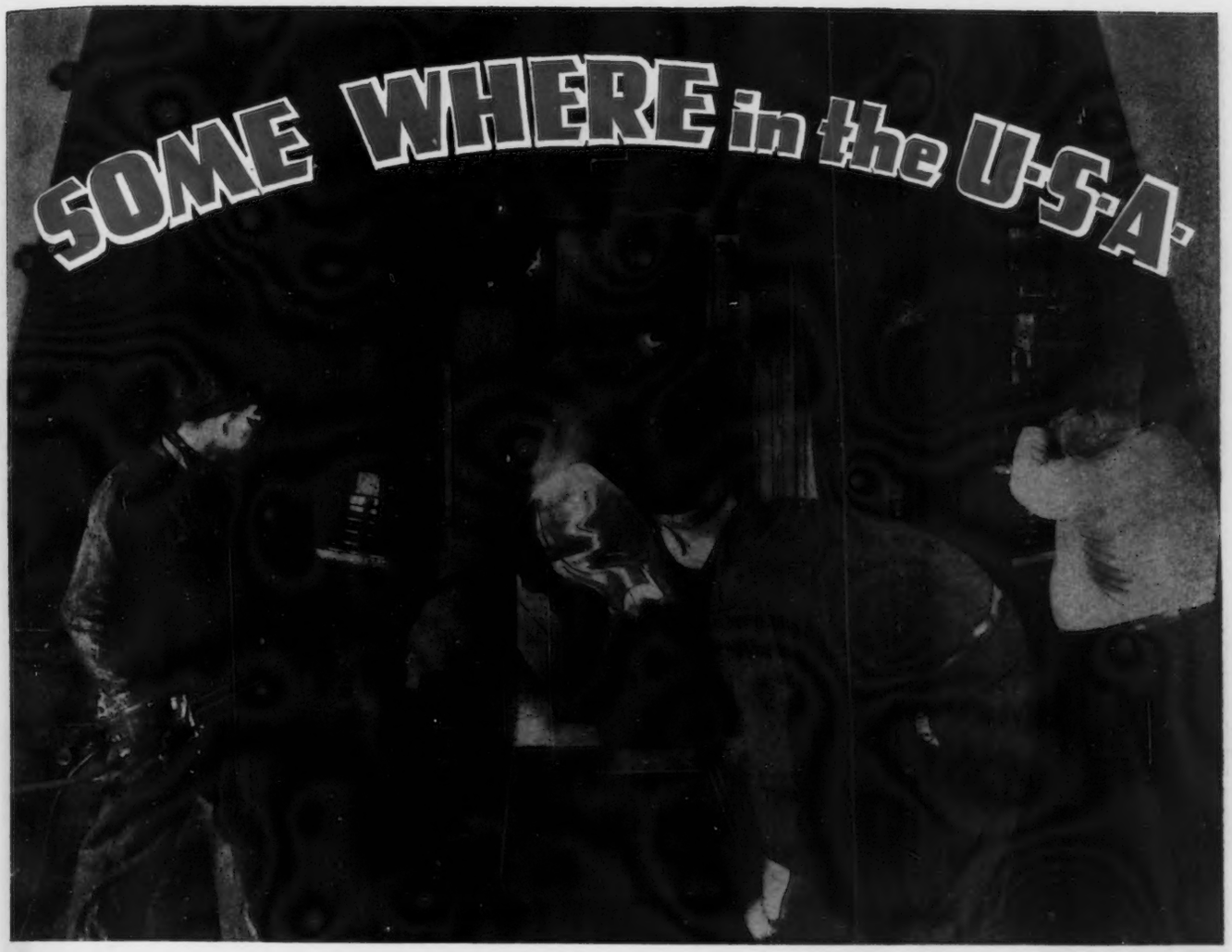


★ ★ SPECIAL MACHINERY *for* WAR PURPOSES ★ ★



16 GIANT ERIES IN ONE PLANT

Work 168 Hours a Week on War Forgings

* *The largest producer of aluminum forgings in the country uses Erie Hammers almost exclusively.*

YOU cannot watch a great Erie Hammer in action without gasping for words to describe it—imagine 16 of them in one plant pounding out sturdy aluminum forgings for planes—168 hours a week. That variable pitch propeller blade will be tough and hard, light and sleek and require a minimum of machining. Props and other parts by the thousands, forged on Erie Hammers, are furnishing the extra stamina required at vital points—the factor of safety that means victory to our air fighters.

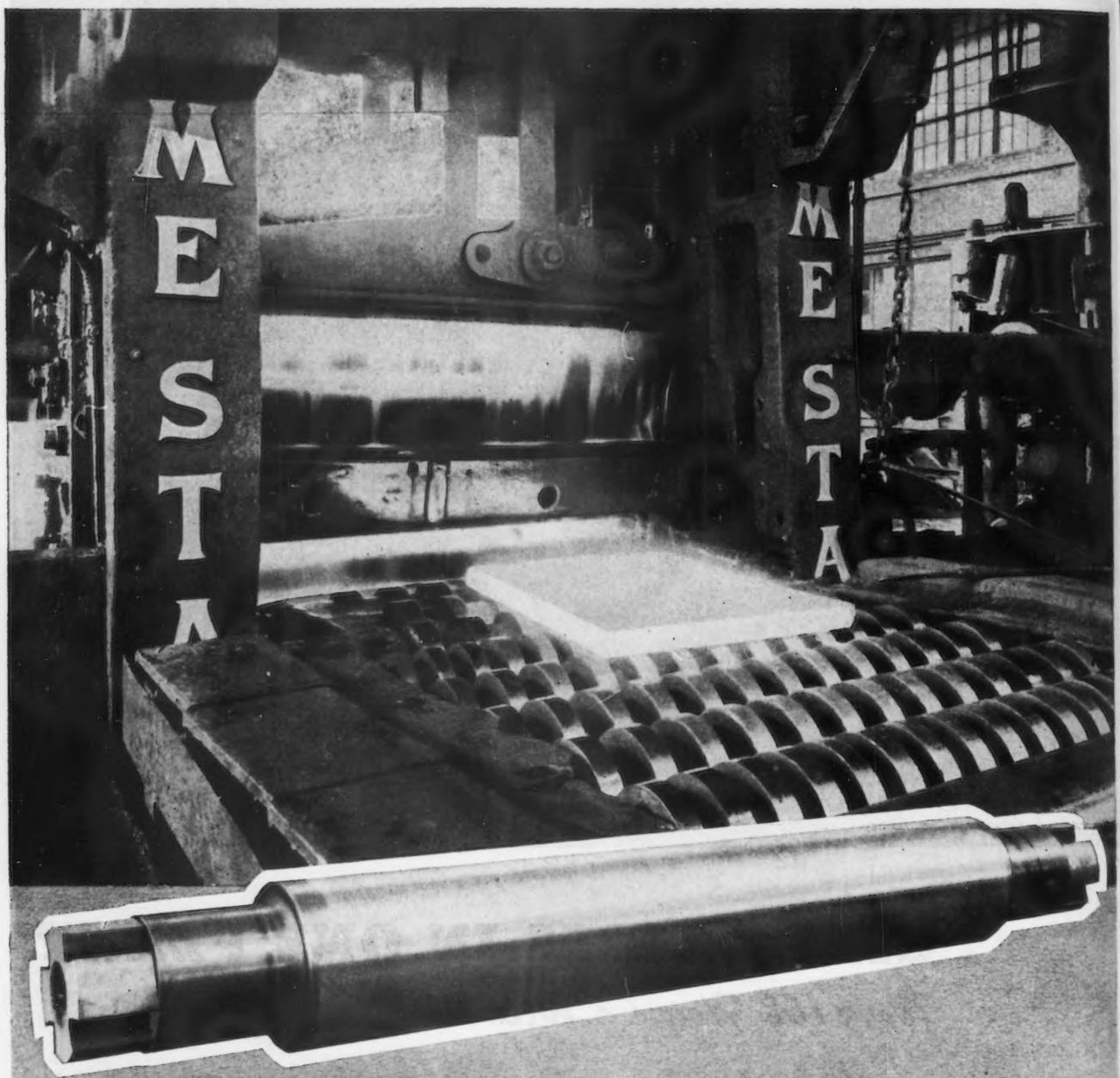
That trio above at a 35,000-pound Erie Hammer operate one of the most responsive, most powerful drop hammers that has ever been built. This company,* operating 16 Eries somewhere in the U.S.A., is the second largest producer of aluminum forgings in the country.

Erie's complete facilities are devoted to war work.

ERIE

ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA

ERIE BUILDS *Dependable* HAMMERS



MESTA ROLLS

for

THREE HIGH PLATE MILLS

SMOOTHER SURFACE—LONGER LIFE

The Army-Navy "E" Flag with two stars, flies over the Mesta plant.

Buy More War Bonds

MESTA MACHINE COMPANY. PITTSBURGH, PA.

DESIGNING—
ENGINEERING—
MANUFACTURE—
of Machinery, Equipment and Parts
Including Tools, Gages, Jigs and Fixtures

A New Service from an Old Manufacturer

Back of this comprehensive service offered by Universal Engineering Corporation is nearly half a century of experience in creating and producing better-than-competitive equipment. Today we offer the most modern facilities for manufacturing; including tool making, heat treating, thread grinding, precision machining, fabricating and assembling. We have a constant and dependable source of labor.

We are prepared and equipped to

(1) Design, engineer and produce machinery or parts to meet your requirements

(2) Engineer and produce machinery or parts designed by you

(3) Manufacture machinery or parts according to your specifications

We are now making aircraft, automotive and ordnance parts, special machinery, and crushing plants. Machines up to 16 tons each in weight, and small fraction of an ounce precision machined parts to a tolerance of .0005".

We are especially well equipped to serve engineering and sales organizations which do not have their own manufacturing facilities.

Write us about your requirements.

★

UNIVERSAL ENGINEERING CORPORATION
607 C Avenue West
Cedar Rapids, Iowa

He learned about Galvanizing on the bottom of 'Frisco Bay!

There, deep below the surface, immersed in a constant bath of corrosive sea water, lay the steel pipe of a water supply line. That pipe, HOT-DIP GALVANIZED before it was laid in 1902, is still in good condition after 40 years of uninterrupted service! HOT-DIP GALVANIZING gave it the thickest possible coating of protective zinc, and saved the taxpayers large sums of money in maintenance and replacement expense. There are other methods of galvanizing, but only HOT-DIP GALVANIZING provides a thick zinc coating fused inseparably to the metal beneath—the most economic rust protection known to modern science. American Hot Dip Galvanizers Association, Inc., First National Bank Bldg., Pittsburgh, Pa.

"If it carries this seal it's a job well done."

HOT DIP GALVANIZING

Buy from the qualified members listed below and KNOW you are getting a genuine HOT-DIP job.

CALIFORNIA
LOS ANGELES GALVANIZING CO., HUNTINGTON PARK
EMSCO DERRICK & EQUIPMENT CO., LOS ANGELES
JOSLYN CO. OF CALIFORNIA, LOS ANGELES
WESTERN GALVANIZING COMPANY, LOS ANGELES
HUBBARD & CO., OAKLAND
JOHN FINN METAL WORKS, SAN FRANCISCO
SAN FRANCISCO GALVANIZING WORKS, SAN FRANCISCO

CONNECTICUT
WILCOX, CRITTENDEN & COMPANY, INC., MIDDLETOWN

GEORGIA
ATLANTIC STEEL CO., ATLANTA

ILLINOIS
EQUIPMENT STEEL PRODUCTS DIVISION OF UNION ASBESTOS AND RUBBER CO., BLUE ISLAND
JOSLYN MFG. & SUPPLY CO., CHICAGO
STANDARD GALVANIZING CO., CHICAGO

MAINE
THE THOMAS LAUGHLIN CO., PORTLAND

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ATLANTIC STAMPING CO., ROCHESTER

OHIO
THE WITT CORNICE COMPANY, CINCINNATI
THE FANNER MFG. CO., CLEVELAND
THE NATIONAL TELEPHONE SUPPLY CO., CLEVELAND
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HANLON-GREGORY GALVANIZING CO., PITTSBURGH
OLIVER IRON & STEEL CORPORATION, PITTSBURGH

RHODE ISLAND
JAMES HILL MFG. CO., PROVIDENCE

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ACME GALVANIZING, INC., MILWAUKEE

Not just Galvanizing **but hot-dip GALVANIZING**

POMONA PUMPS STRETCH YOUR PUMPING DOLLAR

KNOW YOUR VERTICAL PUMP
SIMPLIFY YOUR INSTALLATION
MAKE THE MOST OF PLANT SPACE
TAKE ADVANTAGE OF CONSTRUCTION
CONSERVE POWER REQUIREMENTS
MINIMIZE YOUR REPLACEMENTS
ADJUST PUMPS TO CURRENT NEED

ARE YOU TAKING *FULL* ADVANTAGE OF POMONA'S MANY CONSTRUCTION FEATURES?

Pomona owners are doubly fortunate in these times because no other type pump can match Pomonas for high efficiency . . . for adaptability to varying job requirements . . . for low maintenance and operating costs . . . and for all-around ability to handle virtually *any* pumping application encountered.

Among the *many* construction features that make Pomonas so uniformly efficient under a wide variety of operating conditions, the following are typical . . .

VERTICAL DESIGN

The motor head is at the surface where it can be easily serviced and lubricated

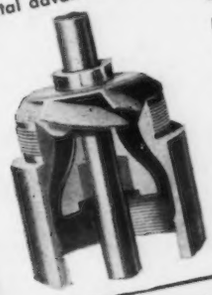
Because Pomonas are *vertical* pumps they require a minimum of floor space . . . in fact, can be mounted directly *over* tanks, vats, or sumps. No costly foundations are needed, no need to disturb existing plant installations. In addition, they require no priming to start, so may be located in out-of-the-way places unsuited to other equipment or can be operated by remote control. ***No other pump is so easy to move from one job to another. No other pump operates with so little attention!***

The pump is at fluid level where it requires no priming, no wasted floor space

Let your nearby Pomona dealer check over your installation and suggest ways you can make greater use of the many advanced construction features incorporated in your Pomona pump!

SEMI-OPEN IMPELLERS

Pomona's Semi-Open Impellers and Bulbous Vaned Pump Bowls represent a vital advancement in both design and performance. Pomona impeller clearance can be adjusted quickly and easily at the pump head, permitting pump capacity to be varied up to 60% of design point without costly throttling. Semi-open impellers will also handle gritty, pulpy or fluctuating flows more efficiently, and greatly minimize risk of vapor, gas or air locking. **Thus, Pomonas can be quickly adapted to a wide range of pumping requirements and fluids with uniformly high operating efficiency!**

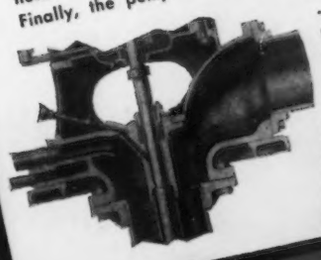


WATER LUBRICATION

In Pomonas, ALL bearings below the motor head are self-lubricated by the fluid being pumped. There are no oil tubes or grease chambers to leak, therefore no risk of contaminating either product or equipment. Also, because lubrication is foolproof, positive, Pomonas take care of themselves without need for frequent attention. **You can use your Pomona for practically any pumping job in your plant with perfect safety to the pump and to the product!**

OPEN DRIVE SHAFT

Pomona impellers are driven by an open drive shaft which eliminates the buying, installing and servicing of a separate housing when conversions are made. Because there are no oil tubes or grease chambers, Pomonas handle fluids under a wide range of temperatures, further increasing their versatility. Finally, the pump can be lengthened or shortened by simply adding or removing standard length shaft sections . . . can be converted from deepwell primary water supply to close-coupled industrial pumping—or vice versa—at minimum cost. **Pomona's need never be idle!**



POMONA
Water-Lubricated
PUMPS

JOSHUA HENDY IRON WORKS

DIVISION OF JOSHUA HENDY IRON WORKS

MARCH...MARCH

Our Boys are Marching!

on to VICTORY

"You Bet", *says the General*—
"and Let's Back up Our Boys
with U. S. BONDS
Buy More and More!"

. . . and in the Meanwhile, DEPEND on
GENSCO for Dependable Steel Service for

COLD FINISHED BARS
COLD ROLLED STRIP STEEL
COLD ROLLED SHIM STEEL
SHEET STEEL
TEMPERED and ANNEALED SPRING STEEL
ROUND EDGE FLAT WIRE
ROUND WIRES
DRILL ROD
STEEL BALLS
FEELER GAUGE

GENERAL STEEL WAREHOUSE CO. Inc.

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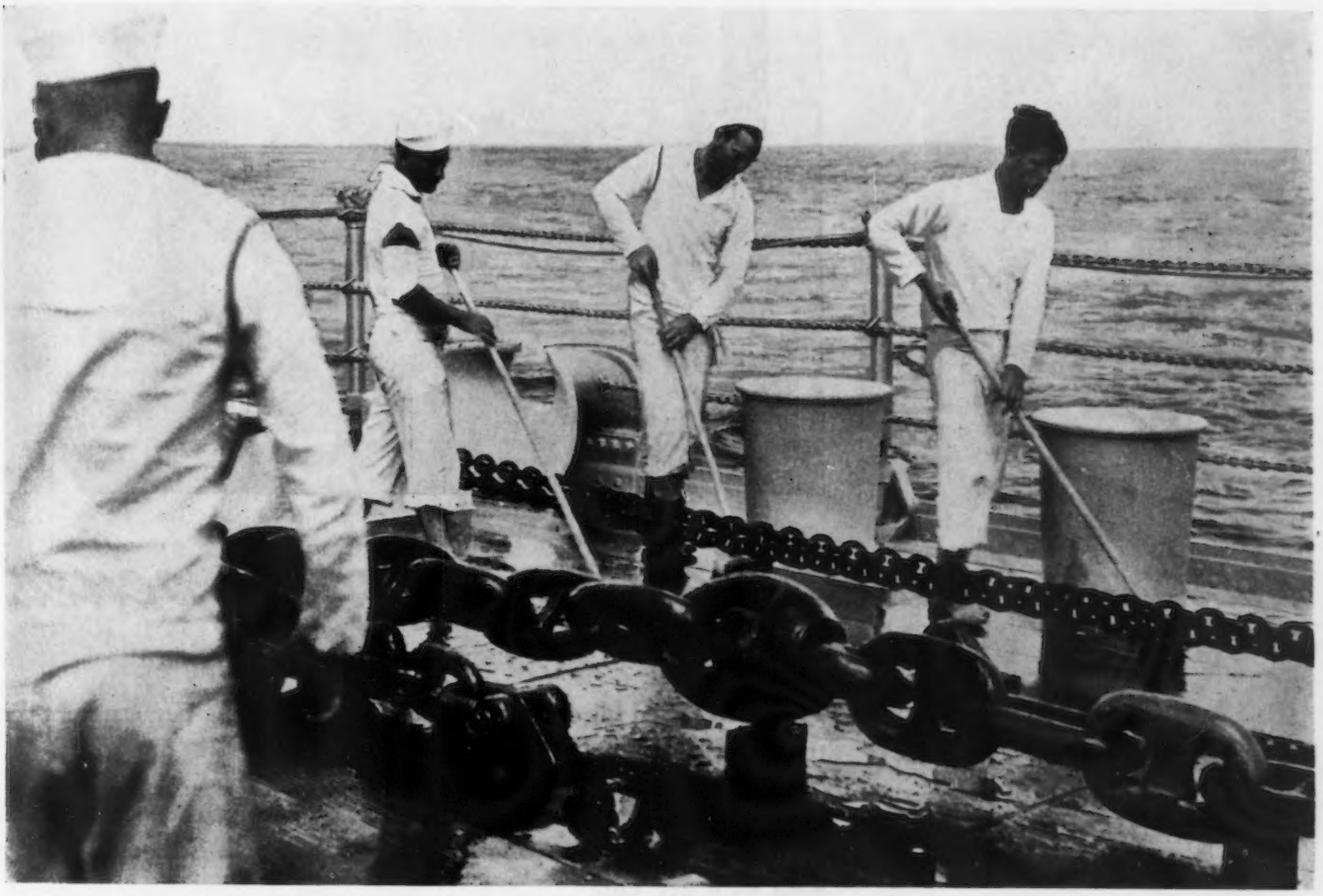
Immediate WAREHOUSE SHIPMENTS

CHAIN IS ON DUTY



As on the ship pictured above, Chain is part of the machinery of war that fights day and night by the side of American Boys throughout the world. Day and night, production of various types of Chain vital to the war program goes forward at full capacity in the factories of The Cleveland Chain & Mfg. Co. The production of this chain and chain for war industries cannot be interrupted, but we are hopeful that our industry may soon be able to secure more steel to cover the manufacture of additional essential agricultural chain items which are distributed by the hardware trade and which are urgently needed by the American farmer.

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Picture of a man having his eyes opened

Furguson raised his eyebrows at the "specs" on the Government contract:

"Part No. 16-B, a forging. Guess they don't care what this job costs. And here are two more forged parts. Well, if that's what they want we'll get 'em."

But his eyes really opened when he got going on the job. Those forged parts required practically no machining — they "miked up" right on the head — and the number of rejects was negligible. They actually saved money on the job.

FORGINGS by PHOENIX

Furguson is already planning to use Forgings in his redesigned air conditioner just as soon as this business of winning a war is finished. He's learned, by experience, that Forgings provide extra strength and durability with less weight and bulk. He knows that his machining time will be materially reduced and that his production costs will be lowered.

Forgings by Phoenix have opened the eyes of hundreds of manufacturers, making possible greatly improved products plus definite savings in production costs. In your plans for the future, you may find it advantageous to talk with Phoenix engineers, and there's no obligation.

PHOENIX MANUFACTURING COMPANY
Catasauqua, Pa.

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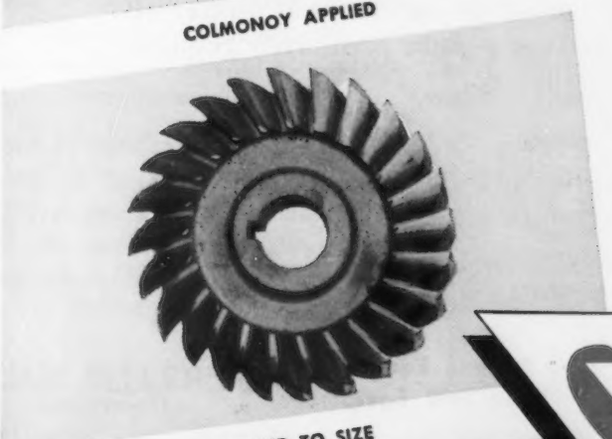
made on the job with
COLMONOY WCR-100

CARBON STEEL CASTING

COLMONOY APPLIED



GROUND TO SIZE

Here's what one manufacturer did to keep a mill on the job. With an old milling cutter as a pattern he made castings of carbon steel. These were built up by welding COLMONOY WCR 100 to the cutting edges, after which the cutters were finish ground to proper size.

This is but one example of the many uses of COLMONOY. Wherever there is the need for hard facing, wherever there is the need for maximum resistance to abrasion and corrosion, COLMONOY will effect economies in production costs. It is available in many grades, and is easily applied by the welding process.

If you have a wear problem, requiring hard facing, or a possible use of hard facing that may affect your operations, our engineers will be glad to discuss the matter with you and co-operate in developing unique applications to meet your specific needs.

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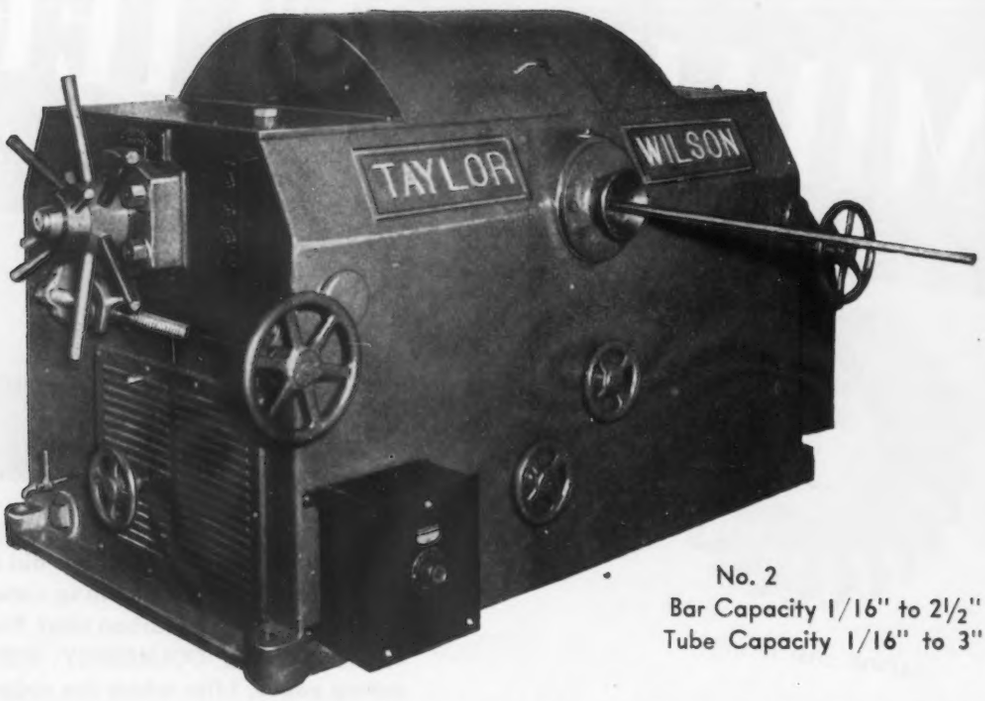

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Tube Capacity 1/16" to 3"

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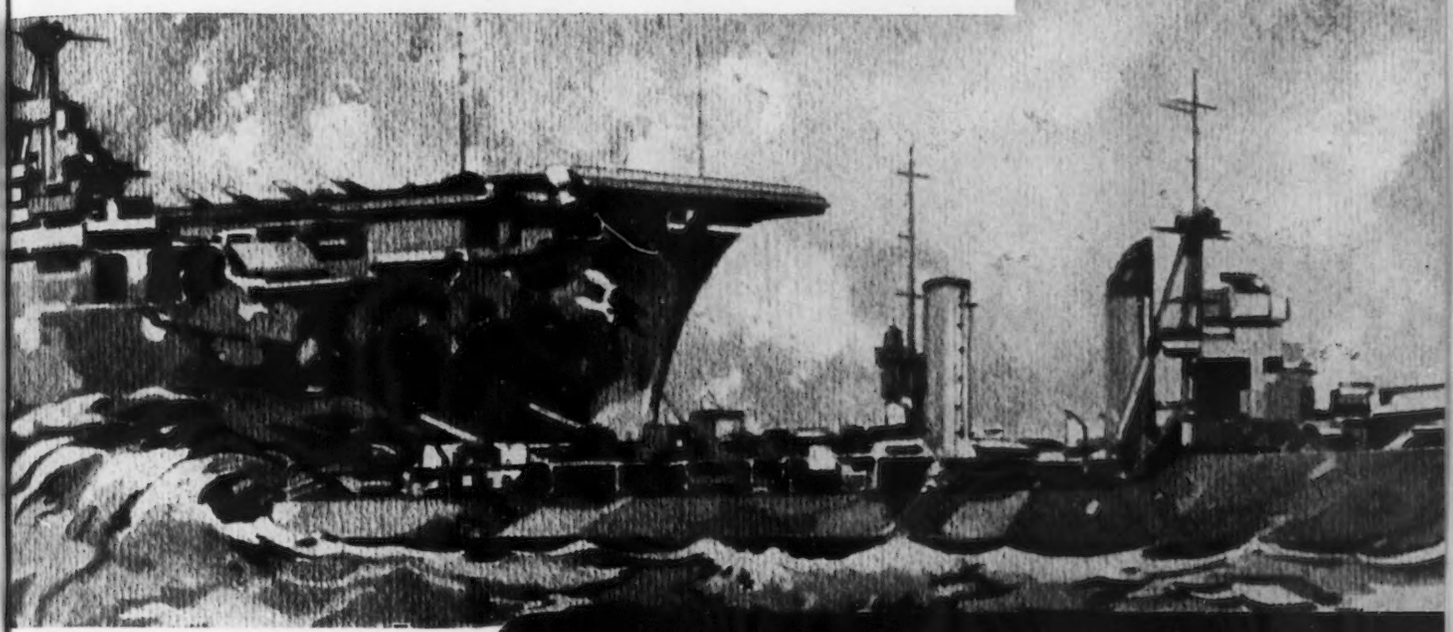

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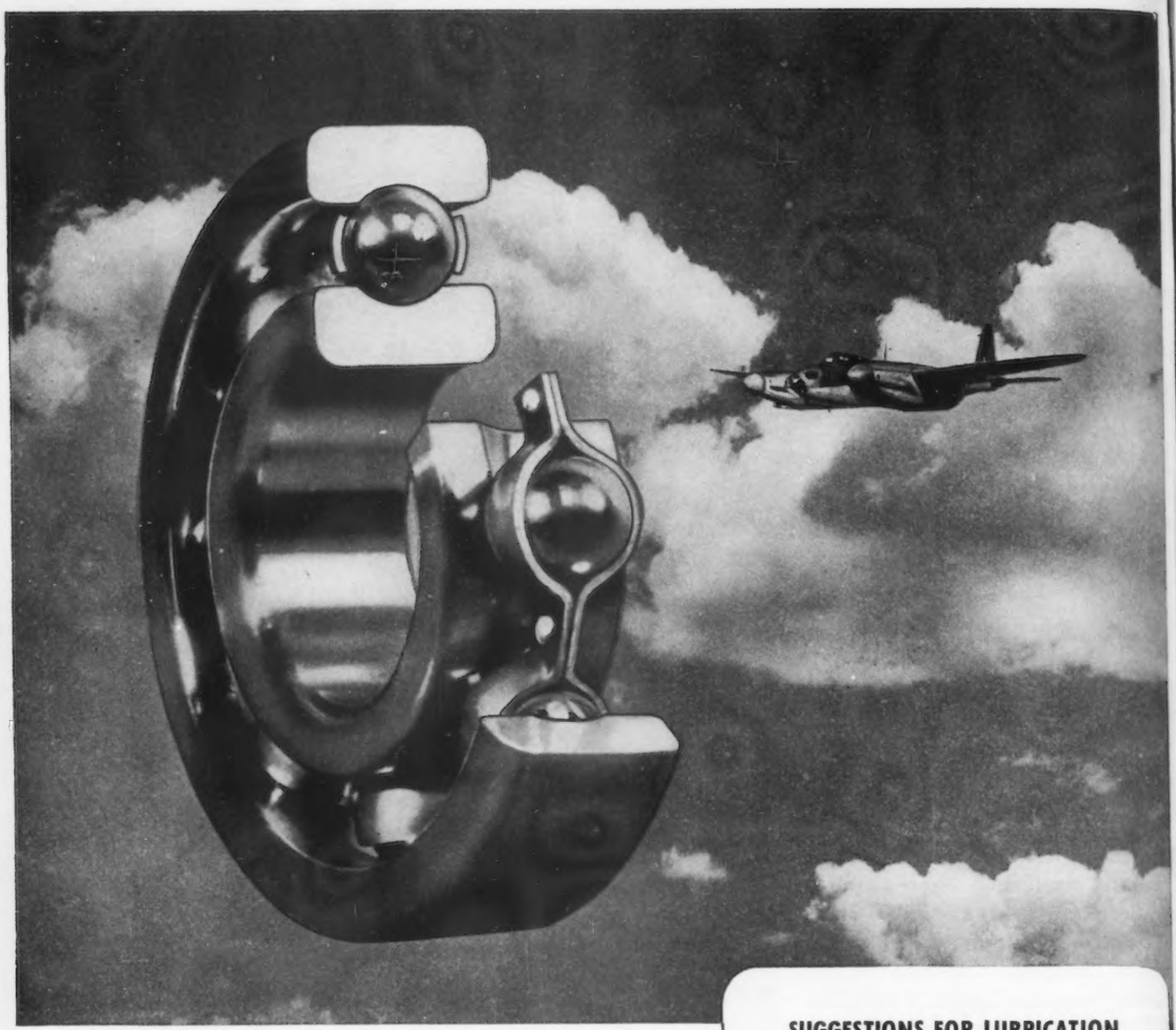

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SUGGESTIONS FOR LUBRICATION OF BCA BALL BEARINGS

1. Choose lubricant carefully. Ball bearings can be lubricated either by grease or oil. The oils and greases used must be neutral mineral lubricants and be free from solid substances of any kind. They must not have a tendency to separate or to thicken and harden.

2. Avoid over-lubrication. When using grease, it is not advisable to have the housing more than one-half to two-thirds full. Loading a bearing housing with too much grease is a common cause for overheating; this is especially true in applications where the speed is in the upper range.

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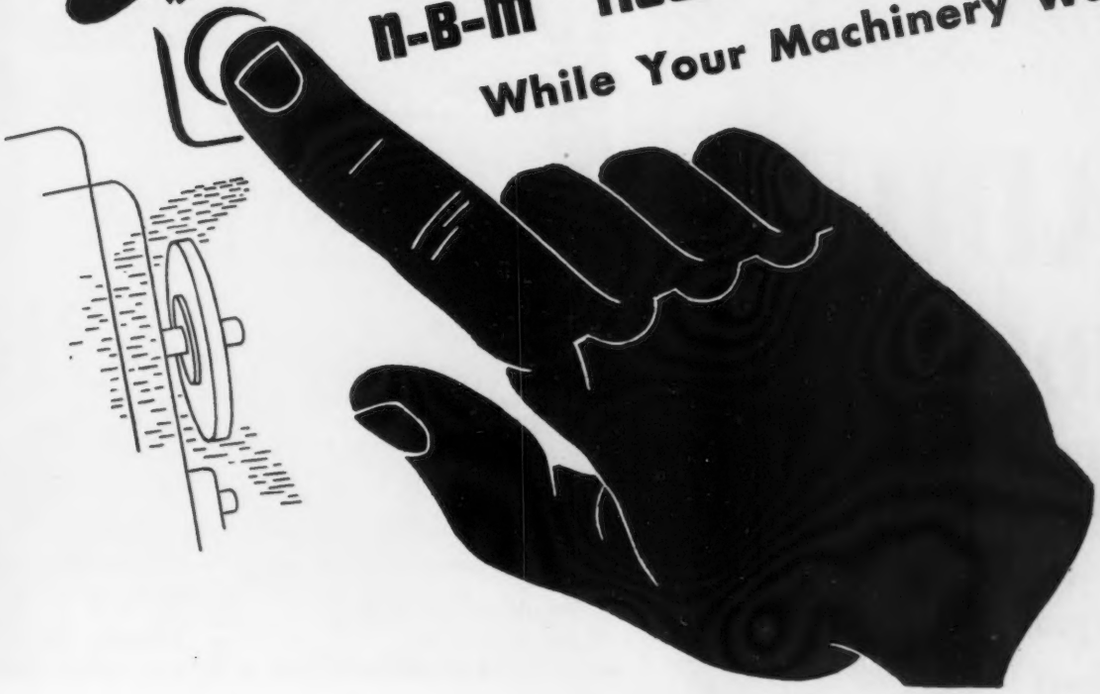

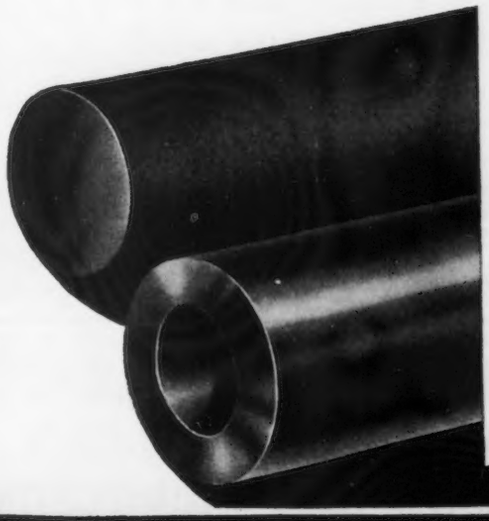

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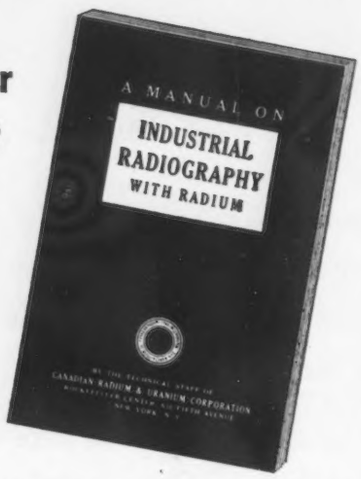

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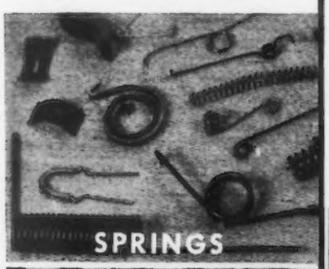

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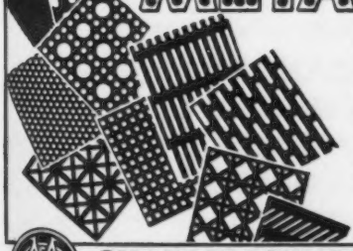

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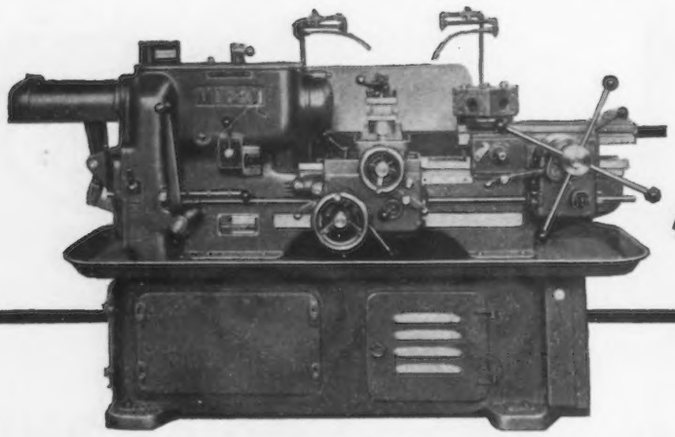

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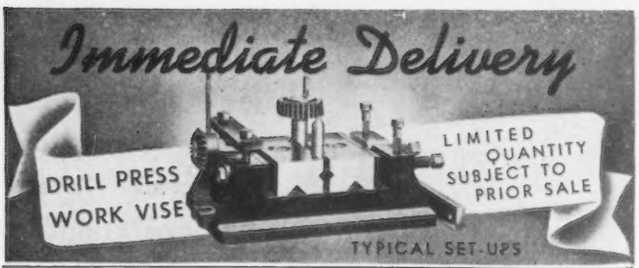

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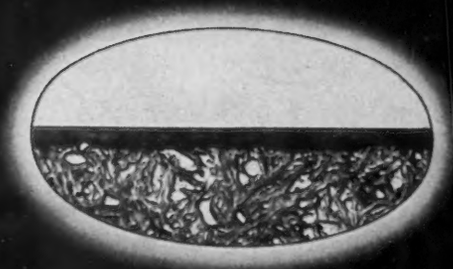

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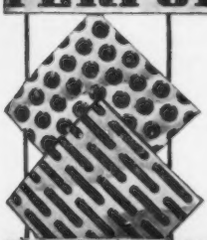

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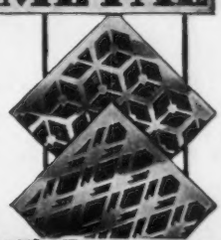

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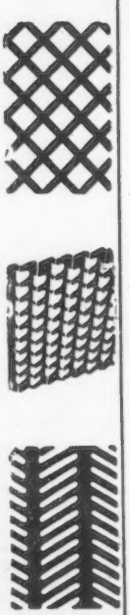

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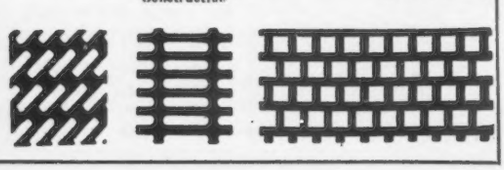

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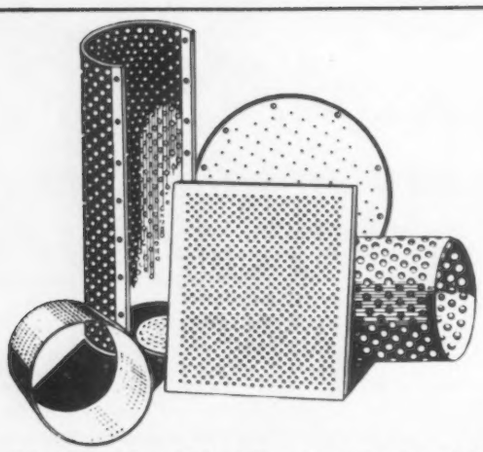

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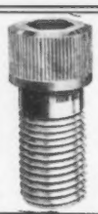
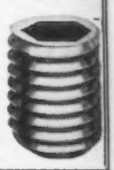


Fig. 1434 Pats. Pend'g

UNBRAKO

Fig. 233



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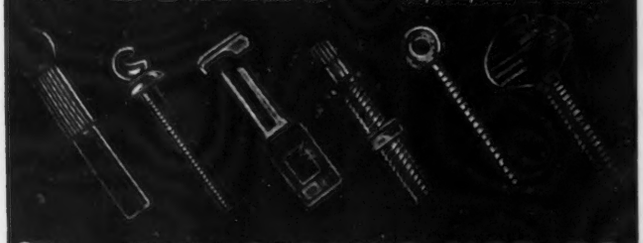

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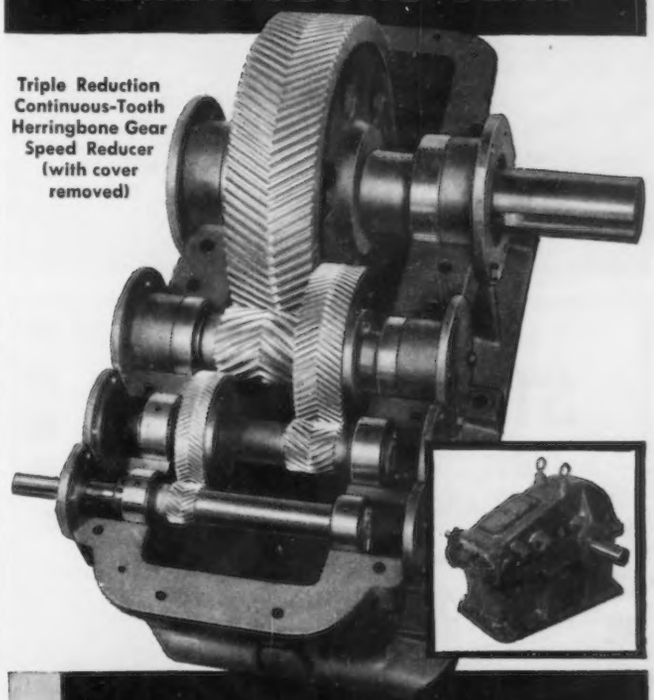

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Convert any engine lathe into a turret lathe in 15 seconds, with JEFFERSON TURRET ATTACHMENTS. To fit bench lathes and lathes up to 24" swing.

Photo Shows Turrets Applied to 16" Lathe

● This new modern TOOL-POST TURRET (below, right), made in 2 sizes, designed to increase production on engine lathes. Easily mounted on cross slide or compound rest. Has capacity of 4 standard tool holders which are easily inserted and rigidly held.

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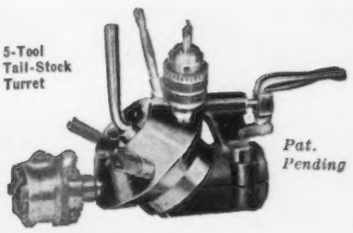
5-Tool Tail-Stock Turret



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4-Tool Tool-Post Turret

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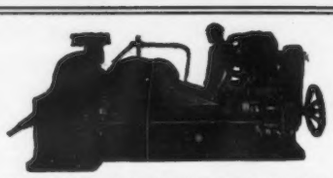

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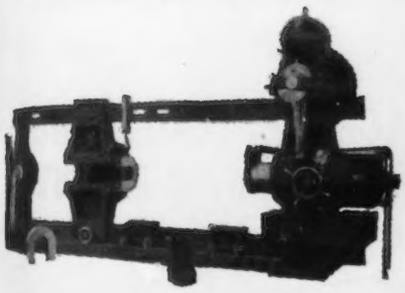

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Motor Driven, Including 15 H.P. General Electric A.C. Motor

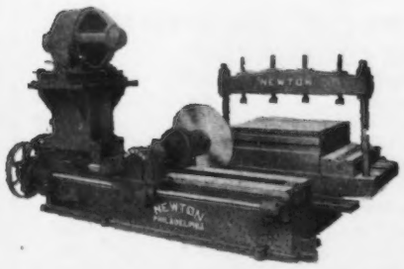
Distance Between Tie Bars 48"

Distance Between Ram and Resistance Head 116"

Machine Mounted on Heavy Base Plate

Pump is Three Plunger Type, giving a variety of Pressures that may be exerted on Piston with a Maximum of 500 Tons

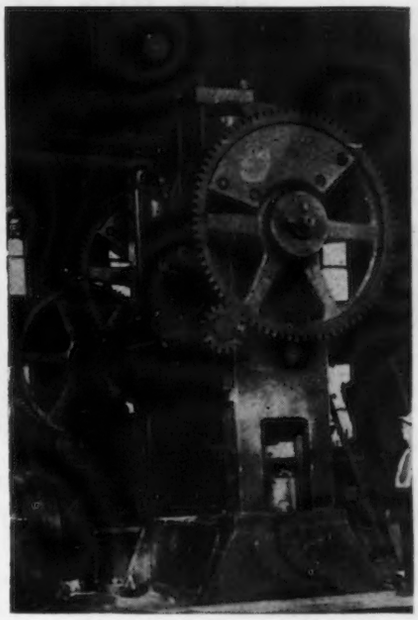
Pressure Gauge is Graduated for Total Tons Pressure and for Pounds Per Square Inch on Ram



26" NEWTON COMBINATION COLD SAW CUTTING OFF MACHINE

Arranged for Belted Motor Drive

Capacity for Rounds	7¼"
Capacity for Squares	6¾"
Capacity for Girder Rails	
Square Cut	9"x5½"
Mitre Cut	7"x4½"
Capacity for I-Beams and Channels in Vertical Position	
Square	15"x7½"
Mitre	15"x6.43"
Size of Work Table	29½"x19"



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Driven by 50 H.P. 230 Volt D.C. Reversing Motor and Control with 5 H.P. Motor for Elevating Screw Adjustment

Clutch Air Operated with Clark Electric Push Button Control

Twin Gear Drive

Tie Rod Construction

Stroke	16"
Bed Area FtoB x RtoL	48½"x73"
Face of Ram FtoB x RtoL	35½"x60"
Daylight, Stroke Down Adjustment Up	24"

3—2 TON OVERHEAD ELECTRIC TRAVELING CRANES 38' 6" SPAN
Complete with three 230 Volt D.C. Westinghouse Type "K" Crane Motors
Speeds Under Load: Hoist 35'—Trolley 75' Bridge 400' Per Min.
Cranes are standard type overhead electric traveling cranes but custom built for fast warehouse service by Calumet Engrg. Works

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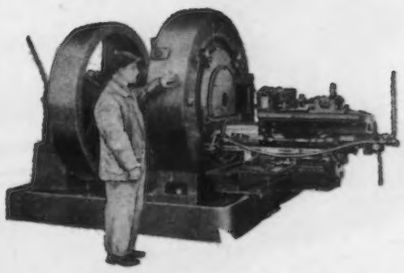
Four 220 Volt D. C. Motors
275' Crane Runway, "A" Frame Construction

7½ TON SHEPARD OVERHEAD ELECTRIC TRAVELING CRANE, 36' SPAN
Complete with four 230 volt D.C. motors and Crane runway 230' long

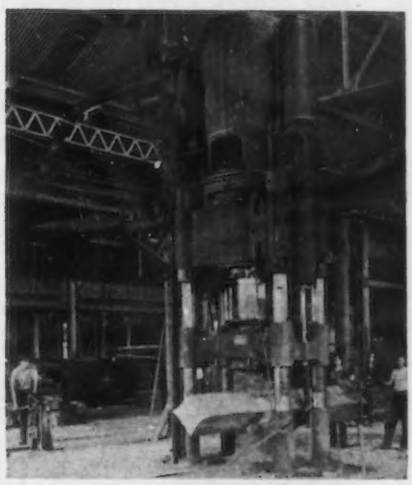


No. 8 LANGELIER SWAGING MACHINE

Equipped with Semi-Autmatic Hydraulic Feed and Automatic Pneumatic Gripping Jaws

Capacity, Tubing	4½"
Capacity, Solid, Cold	3¼"
Capacity, Solid, Hot	4"
Die Length	9"
Die Width	5⅞"
Die Height	4¼"

Complete with Piping and Reservoir, Pump, with Flexible Coupling and Base and Motor Drive with Grooved Flywheel and Motor Sheave, Including V-Belts



800 TON MESTA STEAM HYDRAULIC FOUR COLUMN FORGING PRESS

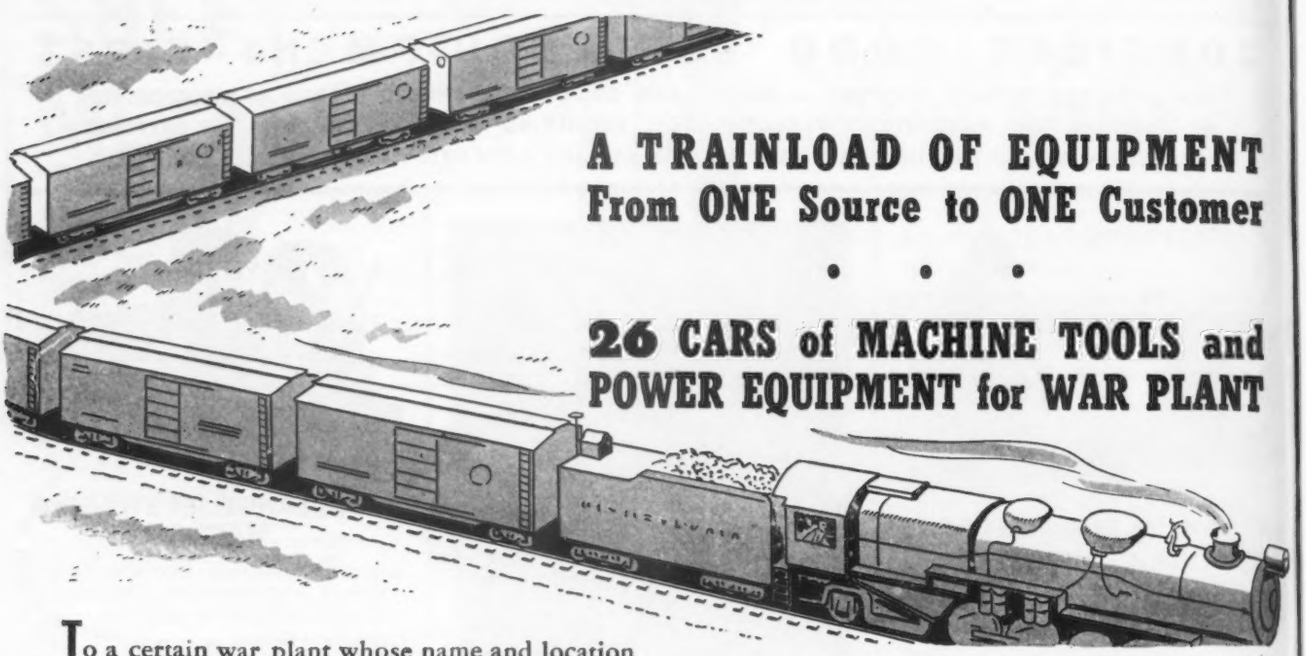
Distance Between Columns RtoL x FtoB	6'x2'9"
Maximum Opening under Top Platen	7'2½"
Maximum Opening Between Upper Face of Lower Die Block and Lower Face of Upper Die Block	40"

Complete with all necessary operating equipment

Manufacturing **RITTERBUSH & COMPANY, INC.** Equipment
30 CHURCH ST.
NEW YORK CITY

Confidential Certified Appraisals
Liquidations—Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased



A TRAINLOAD OF EQUIPMENT
From ONE Source to ONE Customer

• • •

26 CARS of MACHINE TOOLS and POWER EQUIPMENT for WAR PLANT

To a certain war plant whose name and location cannot be disclosed, O'Brien last year made a record shipment—26 carloads of machine tools and equipment at one time. Included in this train load were planers, boring mills, slotters, drill presses, straightening rolls, milling machines, grinders, plate planers, punches, shears, lathes, bolt cutters, screw machines, turret lathes, and all electric motors to special specifications; shafting, hangers, pulleys, belting, boilers, air compressors, pumps—literally everything to put the plant in operation. This buyer not only received at one time equipment almost impossibe to pick up from many different sources, but he saved months of precious time.

PLACE YOUR ENTIRE ORDER WITH O'BRIEN

Selection from current offerings—subject to prior sale

MACHINE TOOLS

DRILLS—5' Bickford Radial 13" column, mtr. drive.
4 spindle Leland-Gifford B.B. Sensitive, #2 taper, tapping attachment.
16" Henry & Wright, belt drive, Sensitive B.B., #2 M.T.

GRINDERS—#6 Bryant Internal Grinder, 12" swing, belt dr.
6" x 18" Landis plain cylindrical, motor drive.
12" x 36" Pratt & Whitney surface grinder, 12" swing belt drive, magnetic chuck.

LATHES—26"-48"x16 McCabe, double spindle, belt drive, 10' centers.
20"x10' American belt drive, quick change.
18"x14' Hamilton belt drive, quick change.
16"-23"x8' South Bend Gap Lathe belt drive, plain change.

LO-SWING—3 ½"x60" Fitchburg Lo-Swing, motor drive, 2 carriages.

MISCELLANEOUS—4" Newton horizontal cylinder boring, 48" maximum cylinder, belt drive.
24"x24"x6' Putnam belt drive, 1 head.
1½" Acme bolt threader motorized.
3" Acme bolt threader motorized
6" Newton slotter 18" table, belt drive.
200-ton Caldwell hydraulic wheel press, motor drive.
#1 Foster Hand Screw machine ¾" capacity, belt drive.
National Chip Extractor motor drive.

POWER PLANT EQUIPMENT

AIR COMPRESSORS

CFM	MAKE	SIZE	TYPE
2312	Ingersoll-Rand	20x20x16	Steam
1400	Ingersoll-Rand	22x14x16	Steam
1156	Ingersoll-Rand	20x12½x16	Steam
1198	Ingersoll-Rand	16x16x14	Belt
888	Ingersoll-Rand	19x12x16	Belt
599	Ingersoll-Rand	16x10x14	Belt
528	Ingersoll-Rand	14x12	Belt
368	Ingersoll-Rand	12x10	Belt
368	Ingersoll-Rand	10x12x10	Steam
311	Ingersoll-Rand	12x8	Belt
311	Pennsylvania	12x8	Belt
240	Pennsylvania	10x9	Belt
215	Ingersoll-Rand	10x8	Belt
173	Ingersoll-Rand	9x8	Belt

MOTOR GENERATOR SETS

100 KW General Electric 3-unit Set with 2—500 KW, 150 volt D.C. Generators—1400 HP Synchronous 3 phase, 60 cycle, 4000 volt 514 RPM
275 KW Allis-Chalmers 3-unit Set, 450 RPM—150 KW Gen., 150 volt and 125 KW Gen., 240 volt 400 HP Syn. Motor, 3/60/4500 volt
150 KW Ridgeway 250 volt—3/60/2300/900 RPM Syn.
100 KW Cr. Wh. 250 volt—3/60/440/1800 RPM
75 KW West. 125 volt. 112 HP sq. cg. 3/60/2300/1200 RPM
35 KW Fairbanks-Morse 250 volt, 60 HP Synchronous Motor, 3/60/220/1200 RPM

Everything from a Pulley to a Power House

THE O'BRIEN MACHINERY CO.

PHILADELPHIA'S LARGEST MACHINERY DEALERS AND EXPORTERS

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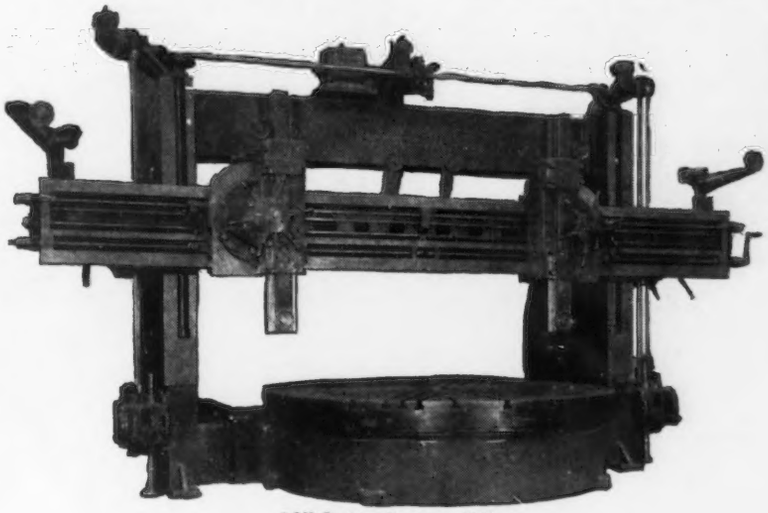
BELL TELEPHONE: MARKET 4180 CABLE ADDRESS. OBRIEN-PHILA

EMERMAN OFFERS BORING MILLS

Quick Delivery From Our Stock

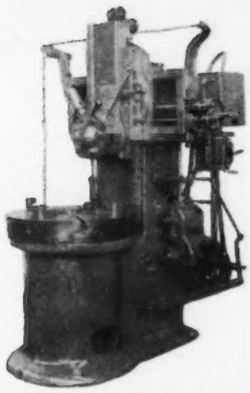


12" Betts Boring Mill

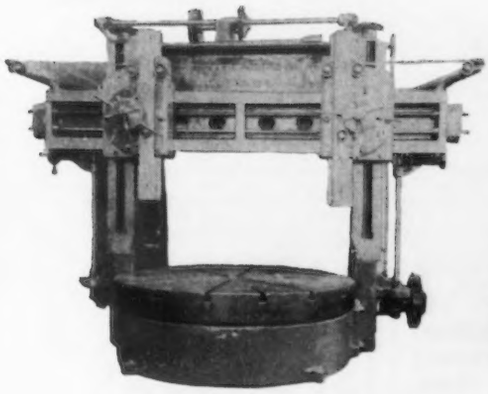
30" Warner & Swasey Boring Mill

Also Available

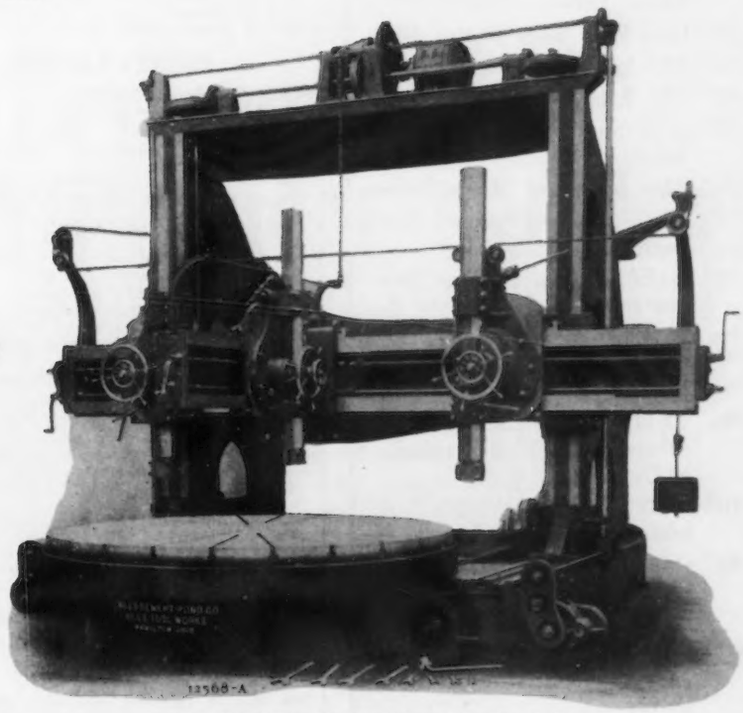
1—44" Bullard Maxi-Mill.
1—42" King V.B.M. with swivel, turret and side head.



30" Rogers Boring Mill



72" Betts Boring Mill with variable speed drive



16'-24' Niles-Bement-Pond Boring Mill

Emerman offers this fine selection of mills and many more which are not shown. Visit our warehouse at your convenience and inspect these machines.

LOUIS E. EMERMAN & CO.
Machinery

873 W. 120th ST. **CHICAGO, ILLINOIS**

THE CLEARING HOUSE

KEEP 'EM RUNNING!

Every machine listed in this column is in our warehouse at press time.

•

14" P&W Surface Grinder

30" x 16' N.B.P. Geared Head Engine Lathe, Quick Change Gears, 230 V.D.C. Motor.

50" x 32' PITTSBURGH Heavy Triple Geared Engine Lathe, Quick Change Gears, 230 V.D.C. Motor.

4½" x 30" BARDON-OLIVER Turret Lathe, Geared Head, Motor Drive.

24" G&E Spur Gear Cutter, M.D.

36" B&S Spur Gear Cutter, M.D.

60" B&S Spur Gear Cutter, M.D.

50" G&E Spur and Bevel Cutter, S.P.D.

90" P&W Spur and Worm Cutter

6" BILGRIM Bevel Gear Generator.

15" GLEASON Bevel Gear Generator.

No. 9 N.B.P. Vertical Miller 39" rotary table, 4" dia. spindle, M.D.

No. 10 N.B.P. Vertical Miller 42" rotary table, 5" dia. spindle, M.D.

30" x 30" x 10' NEWTON Slab Miller horizontal arbor, M.D.

48" x 48" x 20' PATCH Planer, 4 heads, 230 Volt D.C. Rev. Motor Drive.

60" NEWTON Portable Slotter, 230 Volt D.C. Rev. Motor Drive.

SIMMONS ENGINEERED Machine Tool REBUILDING

SIMMONS MACHINE TOOL CORP.

1721 North Broadway, Albany, N. Y.

N. Y. Office: 149 Broadway

IN STOCK

AUTOMATICS

⅞" Gridley Model G, four spindle
¾" Gridley Model F, four spindle
1¼" Gridley Model F, four spindle
1¾" Gridley Model F, four spindle
No. 515 National Acme, four spindle
2½" Cleveland Model A, single spindle

DRILLS

20" Barnes Camelback Drill & Tapper
30" Superior Upright
36" New Haven Upright
2½' Fosdick Radial, c.d.
6' Prentice Radial, s.p.d.
No. 15½ Foote Burt Fixed Center
No. 12 Natco Multiple Spindle
No. 37 Natco Multiple Spindle

GEAR CUTTERS

No. 3 Brown & Sharpe Automatic
No. 6 Fellows Gear Shaper
96" Gleason Gear Planer
15" Gleason Spiral Bevel Generator
No. 5A Lees-Bradner Gear Generator
No. 10 Lees-Bradner Gear Grinder
30" Rochester Gear Tooth Rounder

GRINDERS

22"x48" Pratt & Whitney Vertical Spindle Surface, Timken Bearing
30" Diamond Face, 84" Table Travel
10"x20" Landis Cylindrical hydraulic
14"x50" Norton Cylindrical
No. 60 Heald Cylinder
No. 75 Heald Internal

LATHES

No. 4 Elgin Precision Bench, c.d.
9" Sundstrand Manufacturing, g.h.
18"x 8' Lodge & Shipley, c.d.
24"x 8' Walcott, c.d.
32"x12' Pittsburgh, c.d.

TURRET LATHES

No. 1 Warner & Swasey, c.d.
2A Warner & Swasey, g.h.
2B Foster, g.h.
18" Libby, g.h.
18" Steinle, g.h.
No. 4D Potter & Johnston, g.h.
No. 6A Potter & Johnston, g.h.

MILLS

No. 2½ K&T Milwaukee Vertical
No. 4 Brown & Sharpe, c.d.
No 12 Brown & Sharpe, c.d.
4" Pratt & Whitney Spline
2½" Cleveland Horizontal Boring, s.p.d.
4" Bement-Niles Horizontal Boring
4½"x12" Pratt & Whitney Thread Mill
6"x48" Pratt & Whitney Thread Mill

MISCELLANEOUS

10'x3/16" Stamco Gap Shear
10' x 14 Ga. Stamco Squaring Shear
No. 8 Whiting Comb. Punch & Shear

SAWS

13"x16" Peerless Standard, m.d.
6"x 6" Peerless Universal Shaping, m.d.
No. 12 Higley Cold Cut, 16" blade

Restore your worn machines to their original accuracy by having us rebuild them.

We have a complete rebuilding department operated by men thoroughly trained in rebuilding. Your machines are taken down, carefully checked for wear, and worn parts are replaced, bearings and ways scraped and refitted. You'll find when rebuilt by us, they'll perform like they did when they were new.

WRITE, WIRE OR PHONE US

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.

1959-69 South Meridian St.

Indianapolis, Indiana

EASTERN BRANCH:

44 WHITEHALL STREET, NEW YORK, N. Y.

AUTOMATICS

14"x19" Fay
No. 6A Potter & Johnston
Nos. 33, 34 and 454 New Britain
4½" Gridley model H
6"x6¾" Goss & DeLeeuw
1" Cleveland "J" double end
No. 16 Gisholt simplimatic
10" Bullard "Vert-au-Matic"

BROACHES

Nos. 1, 3 and 4 LaPoint screw
No. 3 LaPoint double screw
No. 2 Standard screw press
2 ton American rack vertical

DRILLS

15", 20", 21" Buffalo
20", 22½" and 26" Barnes
21" and 25" Superior
20", No. 210 Barnes heavy
24" Barnes all geared
20" No. 23 Foote Burt
21' Cincinnati manufacturing
Natco multiple Nos. 11, 12, B12, C12, 14 and 32 8 to 62 spindles
No. 1 Baush multiple
No. 12 Pratt & Whitney multiple
Nos. 15½D and 15½F Foote Burt manufacturing
No. 8H Natco hydraulic horizontal multiple
Barnes vert. mult. hydr.
8 spindle No. 6 Moline Holehog
Nos. 0 and 00 Garvin duplex
4"x19" Sundstrand centerer
4' Hammond radial
Sensitive drills. Almost all makes and sizes

FORGING & STRUCTURAL

1½" Acme upsetters
2½" and 4" Ajax upsetters
2" National upsetter
No. 1A Ajax forging rolls
No. 4 Torrington swager
No. 6HS Langelier swager
60 lb. Bradley helve hammer
150 lb. Nazel air hammer
No. 1 Rock River bulldozer
No. 29 Williams & White bulldozer
12", 1¼"x1" Cleveland horizontal punch
12", 1¼"x1" Long & Allstatter punch
26", ¾" x1¾" Rock River punch

GEAR MACHINERY

Nos. 3 & 12 Barber Colman
No. 18H Gould & Eberhardt
Nos. 1 & 5A Lees Bradner
26" & 48" Brown & Sharpe automatic
30" Flather automatic
36" Gould & Eberhardt automatic
60" Cincinnati automatic
Nos. 6, 61 & 62 Fellows shapers
18" Gleason testers & lappers
15" Gleason spiral gear roughers
Gleason spiral pinion rougher
18" Gleason bevel generator
2 spindle Lipe chamferer
Pratt & Whitney worm grinder
National gear checker

GRINDERS

10x36 & 10x50 Norton
12x36 Landis
12x36 Cincinnati
Capitol internal
Nos. 6 & 15A Bryant internal
12"x36" Diamond surface
20"x50" Safety surface
Nos. 50 & 60 Heald cylinder
18", 24" & 53" Gardner disc
24", No. 84 Gardner opposed disc
17"x36"-48" Norton hydraulic crankshaft
Gisholt tool grinder
24" Ingersoll tub type
30" Ransom elect. snagging
16" Norton snagging
2¼" Wil. & Morman drill
Type 15 Norton lapper
No. 575 Hawes tub polisher
20" & 36" Wet Tool

LATHES, TURRET

28" Steinle, 8" hole
24" Steinle, 6¼" hole
22" Steinle, 3 9/16" hole
22" Libby, 4¼" hole
2¼"x24" & 3"x36" Jones & Lamson
Double spindle Jones & Lamson
14"x6' Lodge & Shipley with turret
No. 2 Acme
No. 2 Southworth
No. 2 Warner & Swasey

LATHES, MFG.

11"x 3' South Bend, QCG
13"x20" Seneca Falls "Short Cut"
13"x 6' Automatic threading
20"x8'6" Wickes mfg.
Melling camshaft
28"x9' centers Bridgeford axle
28"x9' venters Bridgeford axle
3½"x36" Lo Swing

MILLS, BORING

3⅞" bar Beeman & Smith horiz.
4 15/16" bar Barrett cylinder boring
36" Niles vert. car wheel borer

MILLING MACHINES

No. 3 Turnmilling for round work
Nos. 1 & 1A Davis & Thompson drum type duplex
48" Oesterlein tilted offset
Nos. 10 & 45 Productomatic
No. 6 Whitney hand
12" Pratt & Whitney automatic
Model AB Becker vertical

PLANERS & SHAPERS

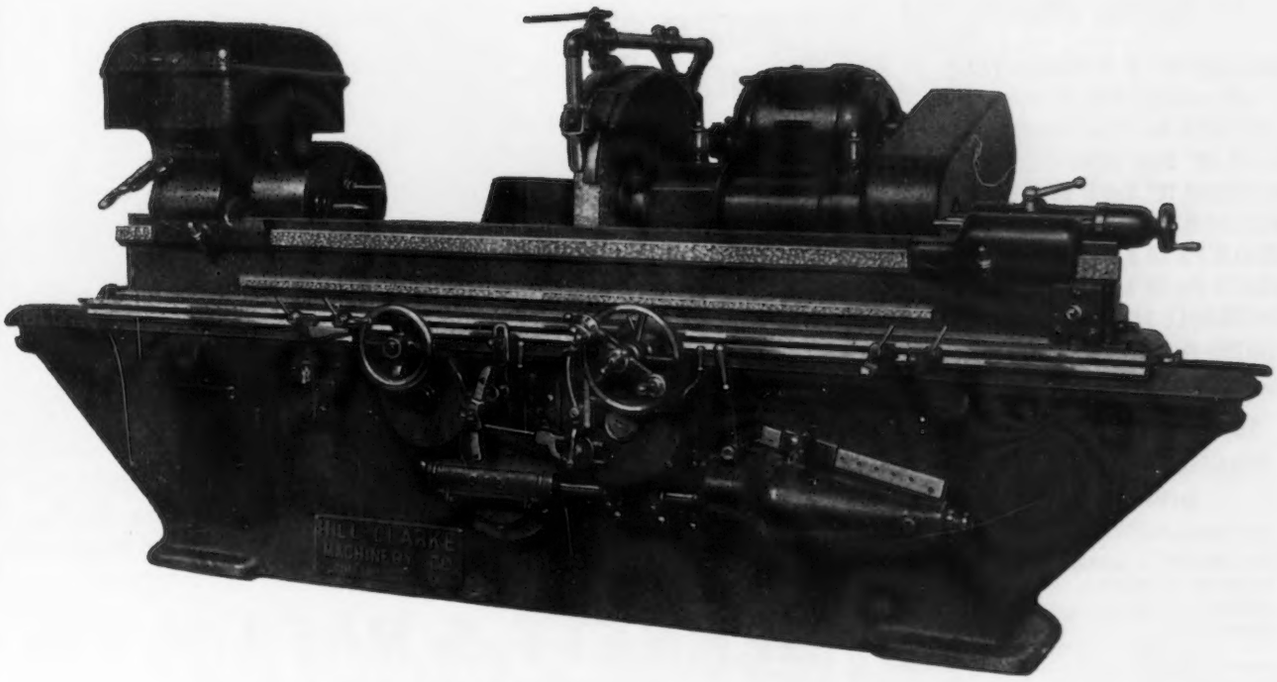
24"x24"x5' Gray
24"x24"x8' Woodward & Powell
29"x29"x6' New Haven
36" Morton draw cut shaper
12" Dill vert. shaper or slotter

MILES MACHINERY CO.

Saginaw, Mich.

THE CLEARING HOUSE

Grinders for Micro-Finish



HILL-CLARKE MODERNIZED CYLINDRICAL GRINDERS

give you a finish within a few micro-inches even when using standard grain free-cutting wheels. Contributing to this achievement is a patented multiple V-belt drive from a constant speed motor to the work spindle.

Throughout the machines there are refinements in design, fitting of components, minimized vibration which make possible extreme accuracy in all grinding operations. An accurately fitted wheel slide with cross feed screw mounted in ball bearings provides sensitive wheel control essential to duplicate work within close limits. Write for literature on Hill-Clarke Grinders available in the following sizes

10 x 36	14 x 36	16 x 50
10 x 50	14 x 50	16 x 72
10 x 72	14 x 72	18 x 96
	14 x 96	

Have You Any NORTON Grinders You Wish Modernized & Motorized?

HILL-CLARKE MACHINERY CO.

647 WASHINGTON BOULEVARD CHICAGO

MOREY

Dependable Used Machines

BULLARD 24″ R. P. Vertical Turret Lathe without Side Head
LAPOINTE No. 2 two spindle Broach—
G & E 48″ Gear Cutter
GLEASON 10″ Spiral Bevel Gear Gen.
GLEASON 6″-18″ Bevel Gear Gen.
HEALD No. 70 A Duplex Internal Grinder
HEALD No. 60 Internal Grinder
INGERSOLL 24″ Cutter Grinder
LANDIS No. 3½ Int. Hyd. Race Grinder

100 ASSORTED MILLING MACHINE ATTACHMENTS
DIVIDING HEADS
VERTICAL—SLOTTING—RACK CUTTING
For BROWN & SHARPE — CINCINNATI KEARNEY & TRECKER — Le BLOND — HENDEY — OHIO — ROCKFORD — KEMPSMITH.

AUTOMATIC MACHINE CO. 12″ x 4′ Quick Return Taper and Relieving Type Lathe for manufacturing TAPS
Le-SWING (SENECA FALLS) 4 x 60″ Lathe SPRINGFIELD 16″ x 8′ Ideal Engine Lathe
P & W No. 12 Multi-Spindle Drill
NATCO C-13 Hyd. Multiple Spindle Drill
ESPEN LUCAS No. 138 Cold Saw Cap. 12″
LANDIS 4″ Single Head Bolt Threader
ACME 1″ All Steel Upsetter
SAUNDERS 8″-18″ Pipe Threader
TREADWELL 12″ Pipe Machine
GISHOLT Precision Balancing Machine
LONG & ALLSTATTER Angle Shears
AMERICAN 30″ x 30″ x 14′ Planer 2 heads, M. D.

THIS IS A PARTIAL LIST—

FOR IMMEDIATE DELIVERY
3 — *New* — FRAY ALL ANGLE MILLING ATTACHMENTS
STYLE "C" — BACK GEARED, MOTOR DRIVE, 3 PHASE, 60 CYCLE, 220 VOLT

Write us your specific inquiries

MOREY
MACHINERY CO., Inc.
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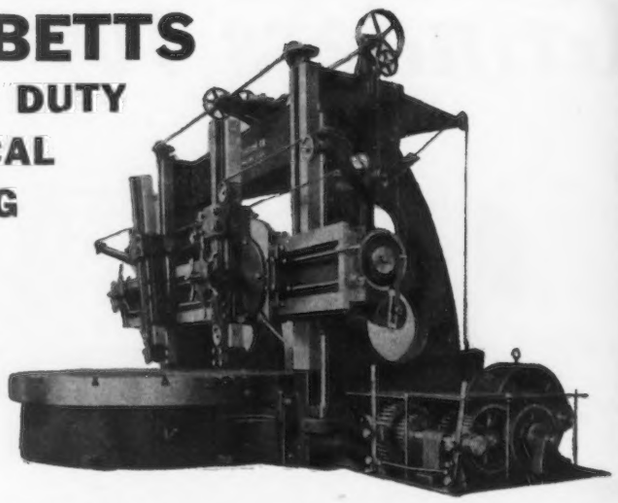
10′ BETTS
HEAVY DUTY VERTICAL BORING MILL



2 hds., table 108" diam., 68" under tool holders, arranged motor drive with motors.

(Also 72" BETTS MILL, gear box A. C., M.D.)

Our Jersey City rebuilding shop has large stock of Bolt and Pipe Threaders, Gear Cutters, Grinders, Keyseaters, Lathes, Planers, Slotters, Punch and Shears, etc. Send us your inquiries.

BENNETT & RAFKIN CO.
30 CHURCH STREET, NEW YORK CITY

LATHES
18″x10′ Lodge & Shipley Gr. Hd. Lathe
14″x 6′ Mulliner Lathe
16″ 6′ Lodge & Shipley
No. 324 Adriance Spinning Lathe
MILLING MACHINES
No. 2-B & 3-B K&T Plain
No. 2 Knight Vertical
2″ Pratt & Whitney Spline (duplex)
No. 3 Wigglesworth NEW
No. 3MS Cincinnati Vert.
No. 3 K&T Plain
No. 2-H K&T Vert.
No. 2-A Brown & Sharpe Univ.
DRILLS
3′9″ Cincinnati Bickford Radial
New Delta Drills, all sizes
4-Spindle Taylor & Fenn M.D. (2)
2-Spindle Leland Gifford
½ Avey 3-spindle Bench, H.S., B.B.
TURRET LATHES
8″ Bullard Multimatic M.D.
Goss & DeLeeuw Chucking 6x6¾″
GEAR MACHINERY
No. 24-H Gould & Eberhardt Hobber
11″ Gleason Bevel Gear Generator
Cimatool Gear Chamfering
Lees Bradner Gear Grinder
9″ Pratt & Whitney Gear Grinder
MISCELLANEOUS
No. 70-A Heald Internal Grdr.
No. 72-A-3 Heald Sizematic
No. 3 Bryant Chucking Grdr.
No. 303 Bliss straight side (2)
No. 225 Adriance Press
No. 1 Foote-Burt Duplex Surface Broach
24″x24″x6′ Whitcomb Planer
36″x36″x8′ Woodward Powell Rev., M.D.

WIGGLESWORTH MACHINERY COMPANY
195 Bent St., Cambridge, Mass.

MACHINES IN STOCK

Cam Cutter—Manville
Degreaser—Colt Autosan Model No. 21
Engravers—Keller No. E3—E4
Gear Burnisher—Fellows
Gear Generator—Gleason 6″
Grinder—Heim Centerless
Grinder—Heald No. 55 Cylinder
Grinder—Brown & Sharpe No. 2 Universal
Grinder—Landis 12″x32″ Plain
Grinder—Norton 10″x50″ Plain
Grinder—Norton 15″x15″x72″ Surface
Grinder—Heald No. 25 Rotary Surface
Grinder—Taft Peirce Thread
Grinder—Farrel—for rolls
Hammer—B & S 2000 lb. Board Drop
Header—National 1″ Wedge Grip Bolt & Rivet Header
Header—Waterbury-Farrel 1½″ cap. S.S.S.D. Ball
Helve Hammers—Many sizes
Lathe—McCabe 28″-48″x10′ Two Spindle
Lathe—Gleason 26″x21″
Lathe—Niles 28″x11′
Miller—Pratt & Whitney 4½x12″, 6x48 Thread
Miller—Cincinnati 18″ Automatic
Miller—Pratt & Whitney 12″ Heavy Automatic
Miller—Lees-Bradner No. 3B Internal Thread
Planer—Gray 36″x36″x10′ Two Head
Profilers—Pratt & Whitney Nos. 12 & 14
Screw Machines—Cleveland 1½″ Model M, 4-Spindle
Screw Machines—Cleveland 2″ Model J.
Screw Machines—Cone 3½″ 4 sp. Automatic
Screw Machines—Cleveland 1¼″ Model B Automatic
Shear—Marshalltown No. 88 Rotary Bevel, M.D.

BOTWINIK BROTHERS, Inc.
New Haven, Conn.

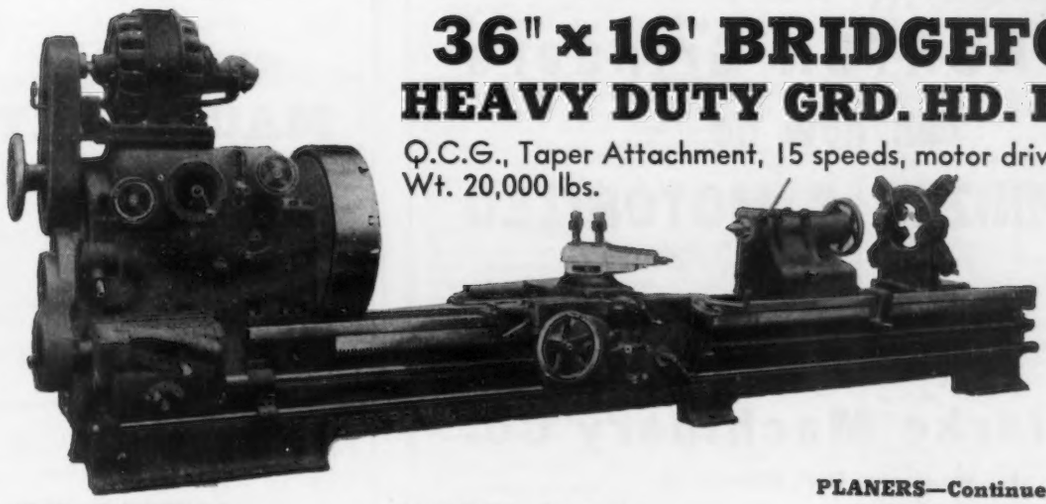
3—Potter & Johnston No. 6A Turret Lathes

AARON MACHINERY CO.
45 Crosby Street — New York, N. Y.

IMMEDIATE DELIVERY

36″ x 36″ x 8′ POWELL PLANER two heads—belt drive

KAMIS ENGINEERING COMPANY
302 Moore St. — Phila., Pa.



36" x 16' BRIDGEFORD
HEAVY DUTY GRD. HD. LATHE

Q.C.G., Taper Attachment, 15 speeds, motor drive. Estimated Wt. 20,000 lbs.

GEAR CUTTERS
11" and 6" Gleason Bevel Gen. (2)
36" x 10" Cinci. #3A Spur
36" x 10" Newark, Spur M.D.
36" G. & E. Spur & Bevel

GRINDERS
30" x 240" Landis Cyl. M.D.
24" x 96" Landis Cyl. M.D.
20" x 96" Landis Cyl. M.D.
24" Bridgeport, Disc., D.C., M.D.
20" Bridgeport, Emery, D.C., M.D.

GRINDERS—Continued
14" x 96" Cinci. Cyl. M.D.
12" x 120" Landis Cyl. M.D.
12" x 96" Landis Cyl. M.D.
#6 Landis Internal
Besly #6 Dble. Opposed Disc, Belt drive

PLANERS
48" x 48" x 16' Cinci. 4 hds., M.D.
36" x 36" x 12' Putnam, 3 hds., M.D.
36" x 36" x 10' Flather, 1 rail & 1 side hd., Revers. D.C., M.D.

PLANERS—Continued
27" x 27" x 6' Woodward Powell, M.D.
26" x 26" x 8' Gray, 1 hd.

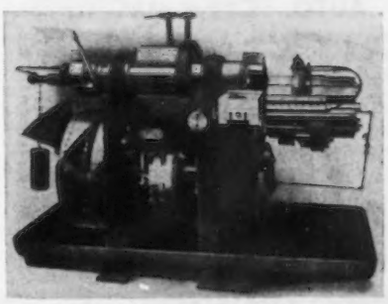
LATHES
90" N.B.P. Wheel Lathe
60" x 28' New Haven Tri. Grd. with 96" pit lathe attachment
36"/60" x 15' Harrington Gap
36" x 16' Bridgeford Grd. Hd., T.A.
32" x 12' Pittsburgh Q.C.G.
20" x 8' Lodge & Shipley
18" x 6' Greaves-Klusman Grd. Hd.

ROSENKRANZ MACHINERY CO.
30 CHURCH ST., NEW YORK, N. Y.

OTT MACHINERY SPECIALS

Automatics, CLEVELAND, 2"-18" feed, M.D.
Automatics, CLEVELAND, 7/8 and 2½" Model M.
Automatics, CLEVELAND, 2½, 3¼ & 5¾" Mod. A.
Automatics, CONE, 2½" 4 spdle. M.D.
Automatics, GRIDLEY, 2¼, 3¼, 4¼ & 5½". Single Spindle.
Automatics, NEW BRITAIN, #22, 23 & 24.
Engraving Machine, #E4 KELLER, M.D.
Gear Hobbers, #3 & 12 BARBER-COLMAN, M.D.
Gear Shapers, FELLOWS, 36" & #7 High Speed.
Grinders, BRYANT, #6, 15 & 18 Internal.
Grinders, NORTON, #B 81—14x36", M.D.
Grinders, NORTON, 14"x36" Plain M.D.
Lappers, 26" BETHEL-PLAYER.
Lathes, 12 & 14"x5' HENDEY.
Lathe, 3x36", J.&L. Dble. Spdle.
Lathe, 8" SUNDSTRAND Stub, M.D.
60"x12' PUTNAM Lathe with 12" Riser Blocks, total swing 85" M.D.
Milling Machines, KEMPSMITH, #2 Plain and Universal.
Milling Machines, #3½ P. & W., Duplex, M.D.
Milling Machines, #1 & 2 CRAFTSMAN, Rotary.
Milling Machine, INGERSOLL Rotary, 2 spdle.
Planer, GRAY, 24"x24"x8', 1 Head.
Planers, 36x36"x10' HAMILTON, 2 Heads, M.D.
Planers, 42x42"x12' OHIO, 1 Head, M.D.
Presses, CONSOLIDATED, #2 to 5, O.B.I.
Presses, TOLEDO, #34, Solid Back Geared.
Presses, Horning, #41 TOLEDO, M.D.
Presses, Horning, #25 CLEVELAND, M.D.
Presses, NIAGARA #77B Dble. Crank.
Presses, FERRACUTE Solid Back, #P2 & 3.
Profilers, 1 GARVIN, #2 spdle., M.D.
Shaper, 24" STOCKBRIDGE M.D.
Stake Riveters, KLING 60", WHITING 30" throat.
Tappers, GARVIN, #1, 2 & 2X.
Tappers, WEBSTER & PERKS, 5 spdle., nut.

OTT MACHINERY SALES, INC.
540 Second Ave. Detroit, Mich.



READY FOR IMMEDIATE USE

One Gridley 2¼" Single Spindle Automatic Screw Machine with complete tooling. Capacity of Chuck 2¼" round; 1.590 square; 1.948 hexagon. Max. length of feed 13½", with regular turners 8"; with finishing slide 12".

EQUIPMENT: 3 stock stands, pump, piping, cams push tube, master collet, master pusher, 4 turret slide tool holders, 1 cut-off tool holder, 1 narrow forming tool holder, 1 set over tool holder, 1 cap fixture, 1 flat forming tool holder, 1 regular turner, 1 stud turner, 1 screw adj. side tool holder, 1 screw adj. knee tool holder, 1 under cutting tool holder, 1 tripping arm for tap & die fixture, 1 drill holder, 1 vert. forming tool holder, 1 set 2¼" collet and pusher, 1 set 2⅛" collet and pusher, 1 set 1 15/16" pads, 1 set of the following: 1 1/16", 1⅛", 1 13/16", ¾", 9/16", ½", ⅝", 11/16", 13/16", ¾", 1 7/16", 1¾", 1¼", 1", 1 3/16", 1 5/16", ⅞", 15/16", 1⅜", 1½", 1 9/16", 1¾", ⅜", 7/16", 2", ¾" sq. ⅝" sq. ½" sq.

Large stock of new and used equipment to quote on. Send us your inquiries.

BOTWINIK BROTHERS OF MASS.
90 GOLD ST., WORCESTER, MASS.

GUARANTEED USED MACHINE TOOLS

DRILLS
4 spdl. Sigourney (4)
4 spdl. Henry & Wright (19)

GEAR CUTTERS
No. 60BM Gould & Eberhardt Bevel Gear Rougher

GRINDERS
(See page 187, Hill-Clarke Cylindrical Grinders)
No. 40 Bryant Plunge Cut, Wide Wheel, Oscillating
No. 10 Lees-Bradner Spur Gear Grinder 1½" dia. New Yankee Drill Grinder

MILLERS
26" x 26" x 10' Ingersoll
26" x 25" x 12' Ingersoll

TURRET LATHES
18" Libby

HILL-CLARKE MACHINERY CO.
647 Washington Boulevard
Chicago, Illinois

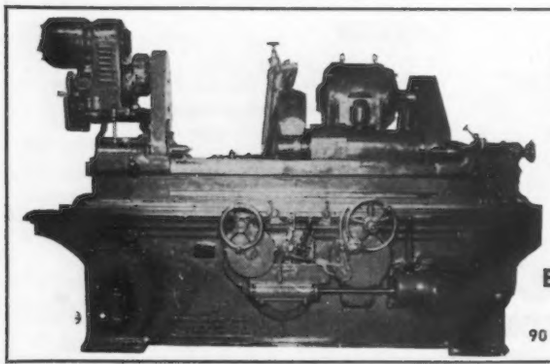
Your NORTON Grinders
can now be
MODERNIZED & MOTORIZED

(See page 187)

We have capacity for limited number

Hill-Clarke Machinery Co.

647 Washington Blvd., Chicago, Ill.



Available:

One completely rebuilt Norton 10" x 50" Cylindrical Grinder—Three Motor Drive.

Available also:

One Bryant #12 Semi-Automatic Internal Hole Grinder. Capacity 15½" swing. Factory Motor Drive.

Large stock of new and used equipment to quote on. Send us your inquiries.

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SURPLUS MACHINERY

In the interests of National Defense, we wish to dispose of the following machine tools:—

1—3" Multiple Spindle Rockford Horizontal Boring Mill
4—Horizontal Broaching Machines
7—Vertical Broaching Machines
1—6A Potter & Johnston Chucking Machine
5—No. 912 Barnes Hydraulic Multiple Spindle Drilling Machines
1—No. 220 Baker 2 Spindle Production Type Drilling Machine
2—E6 Keller Die Engraving Machines
3—No. 16 H.S. Gould & Eberhardt Gear Hobbers
1—No. 10-A Bryant Internal Grinder
3—5" x 16" Arter Auto Cylindrical Grinders
1—62" x 34" Pond Lathe, 5 Step Cone
1—30" x 30" Niles Lathe
2—24" Cincinnati Automatic Mfg. Millers
1—10" Pratt & Whitney Auto Mfg. Miller
1—24" x 24" x 6' Ingersoll Slab Miller
1—30" x 24" x 4' Ingersoll Slab Miller
1—36" x 36" x 12' Ingersoll Slab Miller
3—Gisholt Precision Dynamic Balancing Machines
1—18" Gisholt Static Balancing Machine
1—No. 2 Tinius Olsen Automatic Torsion Balancing Machine
1—½" Acme Upsetter
1—2" Ajax Upsetter
1—3" Ajax Upsetter
1—5" Acme Upsetter

For further particulars, prices, etc., please communicate with—

Citadel Merchandising Co., Limited

P.O. Box 6084, or telephone Plateau 9051, Montreal, Canada, attention Mr. A. E. Rutherford

---

RADIAL DRILLS

3' American maxi. speed enclosed head, M.D.
4' Canedy-Otto, M.D.; Mueller, M.D.

Gridley Automatics ¾" to 4¼"

LARGE LATHES

48"x12' Harrington Gap, sld. bed
48"x26' Niles
26"x13' Boye & Emmes
26"x14' Rahn-Larmon raising blocks to 34"
24"x14' Rahn-Larmon

AARON MACHINERY CO.
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AUTO. SCREW MACHINES

1⅜", 1¾", 2¼" Gridley 4 spindle
1", 2¼" Nat-Acme 4 spindle
3¼", 4¼", Gridley, sgle. spindle

PLANERS

24"x24"x 6' Flather, 1 head
24"x24"x 6' Whitcomb, 2 heads
32"x32"x10' Pond, 1 head
35"x42"x10' Davis, 2 heads
30"x30"x 8' Gray, 1 head
36"x36"x12' Niles, 1 head

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IF YOU ARE DOING DEFENSE WORK

Send for Our Latest Circular Covering Bargains in Small Tools Such as Drills, Reamers, Turret Attachments, etc.

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36"x36"x10' WOODWARD & POWELL Planer
24" GISHOLT Turret Lathe, 6¼" Hole
2½' CINCINNATI-BICKFORD Plain Radial Drill
3½' MUELLER Plain Radial Drill
No. 2 CLEVELAND Plain Miller, S.P.D.
48" BRADDOCK Power Slitter, M.D., ⅛" Cap.

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IMMEDIATE DELIVERY

34" x 32" x 8' CINCINNATI PLANER one head—belt drive.

KAMIS ENGINEERING COMPANY
302 Moore St. Phila., Pa.

10' NILES VERTICAL BORING MILL

CANAL MACHINERY CO.
176 Lafayette St. New York, N. Y.

GRINDERS

Heald No. 70, 55 Int.
Landis 12x36", 16x52", 16"x52", Self-Cont., M.D.
Modern 10x24", 14x12", M.D. Norton 16x50".
Pratt & Whitney 14", BB., M.D.
Norton 50"x28" Roll, M.D.
Heald Rotary Surface, 8", 12", 16".

AARON MACHINERY CO.
45 Crosby Street New York, N. Y.

No. 1 Lumsden Oscillating Tool Grinder, M. D.
72"x36"x10' table Ingersoll Mill
No. 2 P & W Shaving Machine
Wade Bench Profilers

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD ROCHESTER, N. Y.

50" x 28' NORTON roll grinder, M. D.

AARON MACHINERY CO.
45 Crosby St. New York, N. Y.

Automatics, ACME #52-53, 4 spindle
Planer, POND 30"x30"x9', 2 heads
Planer, HARTSON 38"x36"x20', 2 heads
Turret Lathe, GISHOLT 4½"
Radial Drill, DRESES, 4'
Miller, LeBLOND, #4, H.D., table 12"x42"
Lathe, POND 22"x16', L.C., ⅝" spindle

KINGS COUNTY MACHINERY EXCHANGE
394 Atlantic Avenue, Brooklyn, N. Y.

4" FORGING MACHINE

STEEL BED

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SHAPERS

16" Smith & Mills, motorized
24" Kelly, motorized

PLANERS WITH SIDE HEADS

36" x 36" x 10' Woodward & Powell, 1 cross head, 1 side head
36" x 36" x 12' Pond, 2 cross heads, 1 side head

GRINDERS

8" x 12" Van Norman, motorized
8" x 30" Diamond, plain, cylindrical
10" x 18" Norton, cylindrical
10" x 30" Modern, cylindrical, motorized
14" x 46" Pratt & Whitney, surface

NEW 6" x 18" SURFACE GRINDERS MOTOR IN BASE

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SWAGING MACHINES
We Offer For Sale
Torrington — Langeliers
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All In Good Condition—Reasonable
GLOBE TRADING COMPANY
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#12 Barber-Colman Gear Hobbers.
Covel-Hanchett Hydraulic Surface Grinder.
15-ton Variety Iron Works Crane, 50' boom.
Alligator Doubling Shears, cast iron, low knife, size 36, capacity 2", 11" jaw opening, 36" blade, with 5 HP motors.
#6-A Potter-Johnston Turret Lathe.
750-lb. Waterbury-Farrel Board Drop Hammer.

THE ELYRIA BELTING & MACHINERY COMPANY
ELYRIA, OHIO

HIGH SPEED BLANKING PRESSES
No. 2 Waterbury Farrel, 40 ton
50 ton Henry & Wright, 2" stroke

DOUBLE CRANK PRESSES
No. 4-337 Verson Allsteel, gap frame
(2) No. 3-24 Bliss, straight side

J. N. MOYER
471 N. 5th St., Philadelphia, Pa.

Bliss #1½ Toggle Press.
Toledo 92B DBL. Crank straight side Press.
Production Machine Co. #101 Polishing Machine, for round bars.
63 Ton ¼x⅞x112⅛" Rd. Edge or Steel.

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EAST BOSTON, MASS.

POWER PRESSES
BLISS, TOLEDO, V & O, ETC.
REBUILT GUARANTEED
JOSEPH **HYMAN** & SONS
Tioga, Livingston and Almond Streets
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Press—#158 B Cleveland, DBL Crank, Bed 48"x72", Stroke 16"
100,000# Riehle Testing Machine
Angle Shear—6x6x1 #3 H & J
Angle Shear—8x8x1¼, #5 L & A
Boring Lathe—42"x60' Amalgamated
Boring Mill—60" Baush—2 Hds.—Heavy
Boring Mill—70" Pond—2 Hds.
Brake—6'x¼" D & H—Leaf Type
Brake—10 x 10 ga. Ohl—Press Type
Bulldozer—No. 5 Williams-White
Centerless Grinder—Heim
Compressor—690 ft. Chicago, 19 & 14x12
Crane—15T 33'-3" P & H, 220V. DC
Drill—5' Prentice
Forging Mach.—1½ & 3" Ajax, 4" Acme
Gear Shaper—#6 Fellows—36"
Grinder—12"x48" Modern
Grinder—Diamond Face Table 19"x90"
Grinders—No. 60 Heald Internal
Hammer—200 Lb. Bradley Helve & Upright
Hammer—2000 Chamb. Board Drop
Lathes—16"x10' New Haven
Lathes—36"x24' Putnam, Face Plate Drive
Lathes—20"x12' Blaisdell
Mult-au-matic—12" 6 spdl. Bullard
Planer—60"x60"x18' Pond—2 Hds.
Press—No. 59 Toledo S.S. 12" Stroke
Punch—30" Cleve. Arch. Jaw
Punch—36" Bertsch ⅞" thru ⅞"
Punch—60" H & J #6, 1½ throat 1¼
Roll—10x1" Hetherington
Roll—Vertical—14' Wicks
Shear—11' x 16 ga. Under Drive
Shear—Slitting, 6'x¾" Marshalltown
Slotter—14" New Haven

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Phone Co-2103
513 Empire Bldg. Pittsburgh, Pa.

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8"-9"-10"-16" ROLLING MILLS

with Electric Motor Generator Sets, Variable Speed Motors, Steam Boilers, Steam Engine, Roll Turning Lathes, D. C. Constant Speed Motors, Electric Lifting Magnets, Mill Cooling Beds, Alligator Shears, Scales, Steam Pumps, Water Heaters, Hot Saw, Mill Trucks & Tools, Cast Iron Floor Plates and Ingot Molds, Steel Buildings, etc.

Will sell as one lot or separate items. Apply for detailed list.

LEBANON STEEL & IRON COMPANY
Lebanon, Pa. Phone #660

ROLLING MILLS

1—12" Mill consisting of 1 pinion stand, 2 stands 3-high, 1 stand 2-high.
1—20" Mill top and bottom screw 1 stand and 1 pinion.
1—400 H.P. Allis-Chalmers synchronous motor, speed 450 RPM, direct connected to a 500 H. Falk Herringbone gear reducer speed 2.85 to 1.
2—Lewis Wire Coilers.

If interested write

SCHNITZER STEEL PRODUCTS CO.
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We have (2) ½" Wire St. — 12' Cut offs
Perfect Condition — Price Reasonable
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1—DETROIT REX PRODUCTS COMPANY DEGREASER for degreasing wire in coils. Automatic operation.

THE SENECA WIRE & MFG. CO.
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HYDRAULIC PRESS

1000 ton Hydraulic Press built by R. D. Wood Company, up-moving type, 6 posts, platen 42" x 108", stroke 18", daylight space 36", complete with water tank, high pressure piping, gauges, valves, fittings, accumulator, intensifier, pump, 50 H.P. motor and compensator. Was used on forming propeller blades. A-1 condition. Immediate delivery.

BORING MILL, 60" Niles, R.P.T., M.D.
BORING MILL, Horiz. 4¼" bar, S.P.D.
BROACH, No. 2 LaPointe, stroke 44", M.D.
BULLDOZER, No. 2 Williams & White, B.D.
DRILL, Hv. D. No. 314 Baker
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HAMMER, Steam Drop, 3000# Massillon
HAMMER, Steam Forging 1100# N-B-P
HAMMER, Steam Forging 2000# Morgan
MILLER, Plain, No. 1 Cincinnati, M.D.
PRESS, D.C. No. 95-B Toledo, 55"x54"
PRESS, Toggle, No. 3 Bliss
PRESS, Toggle No. 14 Bliss, 350 Ton
PUNCH, 3-A Royersford, 1"-¾", throat 10"
SHEAR, Squar. 44"x3/16" American, M.D.
SHEAR, Squar. 54"x3/16" American, M.D.
SLOTTER, Portable 48" Morton, M.D.
STRAIGHTENER, 12-roll K. & R., 1¼", M.D.
STRAIGHTENER, Plate, H. & J. 84"x½", M.D.
TESTING MACH., Brinnel, 3000# K.G.
TURRET LATHE, 34" Gisholt, H.S. 4¼", M.D.
Torrington Tube Straightener ¼" to ⅝"

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GOOD USED EQUIPMENT

1—150 ton FAIRBANKS, MORSE Railroad Track Scale, 46' long
1—9' CLEARFIELD Grinding Pan, self-discharging, motor drive with 60 HP DC motor
1—9' CARLIN Grinding Pan, self-discharging direct motor drive, without motor
1—HASSEL direct safety foundry swing grinder, motor 5 HP, 230 volts, DC
1—NATIONAL 10-ton Winch, single drum, direct motor drive, without motor

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DETROIT ROCKING ELECTRIC FURNACES
200#—250#—350#—750#—1000# sizes. We are interested in buying Electric Furnaces. Tell us what you want to Buy or Sell.
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One No. 4 Whiting cupola in good condition. Reasonable.

Write
KEEN FOUNDRY COMPANY
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1—Positive Roots type blower. For 72" or less cupola.
Mounted on base, without motor.
Price $750.00. Excellent condition
THE BUCKEYE MACHINE COMPANY
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BALDWIN IRON WORKS
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FOR PROMPT SHIPMENT

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200 H.P. G.E. TS 514 RPM

SLIPRING MOTORS

500 H.P. A-C 1150 RPM
250 H.P. G.E., 240 RPM (2)
200 H.P. G.E., 720 RPM
200 H.P. G.E., 514 RPM
125 H.P. Burke, 600 RPM
75 H.P. West., 1200 RPM (5)
64 H.P. G.E., 585 RPM
60 H.P. West., 1200 RPM
60 H.P. West., 290 RPM
(180 additional slipring motors, 1 to 50 H.P. in stock.)

SQUIRREL CAGE MOTORS

200 H.P. G.E., 600 RPM
150 H.P. G.E., 600 RPM
100 H.P. West., 720 RPM (4)
100 H.P. G.E., 720 RPM (2)
100 H.P. G.E., 600 RPM
100 H.P. Cr.-Wh., 1800 RPM
75 H.P. West., 1800 RPM
60 H.P. G.E., 1800 RPM
50 H.P. Allis Ch., 720 RPM
50 H.P. G.E., 720 RPM
50 H.P. G.E., 600 RPM
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25 H.P. G.E., 1750 RPM (10)
(310 additional squirrel cage motors in stock, ¼ to 50 H.P.).

A.C. GENERATORS

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150 KW G.E., 900 RPM
150 KW G.E., 720 RPM
100 KVA Cr.Wheeler, 900 RPM
100 KVA West., 600 RPM
90 KW G.E., 900 RPM
75 KW West., 900 RPM
30 KW G.E., 1200 RPM
24 KW F.M., 1200 RPM

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50 KW Burke, 1200 RPM
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(18 additional sets in stock, 1 to 25 KW)

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(19 additional 125 V. M.G. Sets in stock, ½ to 25 KW)

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60 H.P. Roth, 600 RPM
50 H.P. G.E., 850 RPM
40 H.P. El. Dyn., 1450/2600
40 H.P. G.E., 1700 RPM
40 H.P. Allis Ch., 1150 RPM
40 H.P. Reliance, 625 RPM
25 H.P. G.E., 1150 RPM (3)
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20 H.P. G.E., 1750 RPM
(235 additional motors, ½ to 20 H.P. in stock)

115 VOLT D.C. MOTORS

90 H.P. G.E., 900 RPM
15 H.P. G.E., 1150 RPM
10 H.P. L.A., 3600 RPM
10 H.P. F.-M., 1150 RPM
10 H.P. West., 850 RPM
7½ H.P. G.E., 1750 RPM
7½ H.P. West., 1150 RPM
7½ H.P. G.E., 850 RPM
(115 additional 115 volt D.C. Motors, ½ to 5 H.P., also in stock)

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RE-NU-BUILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D. C. MOTORS

HP	Make	Type	Volts	Speed
1—1500	Whse.		550	330
2—1250	G.E.	MPC	500	130
1— 800	G.E.	MPC	600	600
2— 625	G.E.	MPC	500	130
1— 600	G.E.	MPC	600	650/900
1— 600	Whse		250	150/275
1— 350	G.E.	MPC	230	450
3— 300	G.E.	DMC	230	400/600
1— 300	Cr. Wh.	CMC	230	1150
1— 300	G.E.	MPC	230	275/550
1— 270	Whse.		500	250/400
1— 250	Al. Ch.		230	525
2— 200	Whse.		230	400
1— 175	Whse.	SK	250	150/525
7— 150	G.E.	RC-19A	230	800/1000
2— 150	Whse.	SK-201	230	300/900
1— 150	G.E.	MPC	230	250/450
2— 125	G.E.	CO-1832	230	625
3— 120	Whse.	SK-180	230	720
3— 100	G.E.	LC-50	230	1200
1— 100	Al. Ch.		230	950/1150
2— 100	G.E.	RC-19	230	575/720

ROTARY CONVERTERS

Primary 3 Phase 60 Cycle

1—1500 KW Whse., 720 R.P.M., D.C. 600 V., A.C. 2640Δ/13200 V.
1—1500 KW Whse., 600 R.P.M., D.C. 600 V., A.C. 11500Δ/10360 V.
1—1250 KW G.E., HHC, 720 R.P.M., D.C. 250 V., A.C. 2300 V.
1—1000 KW Whse., 900 R.P.M., D.C. 600 V., A.C. 11000/2300 V.
2—750 KW Whse., 1200 R.P.M., D.C. 600 V., A.C. 5500/2300 V.
1—750 KW Whse., 720 R.P.M., D.C. 250 V., A.C. 6600/2200 V.
1—500 KW Whse., 900 R.P.M., D.C. 250 V., A.C. 6600/2200 V.
1—500 KW Whse., 1200 R.P.M., D.C. 600 V., A.C. 2300 V.
3—375 KW Whse., 1200 R.P.M., D.C. 250 V., A.C. 6600/2200 V.
3—300 KW G.E., HCC, 1200 R.P.M., D.C. 600 V., A.C. 2300 V.

3 Phase 25 Cycle—Booster Type

2—1500 KW G.E., HCC, 500 R.P.M., D.C. 225/275 V., 6000 Amp., A.C. 13200/6600 V.
1—500 KW G.E., HCC, 750 R.P.M., D.C. 225/275 V., 2000 Amp., A.C. 6600 V.

BELYEA COMPANY, INC.
47 Howell Street, Jersey City, N. J.

TRANSFORMERS

3-200 KVA Maloney Single Phase 60 Cycle 22000—11000—230—460

3-262 KVA G. E. Single Phase 60 Cycle 22000—9500—105—210

FORT PITT STEEL CASTING CO.
McKEESPORT, PA.

FOR SALE
PANGBORN SAND BLAST

Type 2 GH—5 cu. foot barrel capacity. Direct pressure blast application. Complete unit with blast machine and abrasive separator. Arranged for motor drive. This unit is in perfect condition. Price cheap.

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STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.
DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.
GASOLINE—110, 160, 220, 310, 1300 ft.

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MODERN
AIR COMPRESSORS
All Types and Sizes
Rebuilt-Guaranteed

EARL E. KNOX COMPANY
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Over 150 in stock
New and Guaranteed Rebuilt
Modern Plant doing Modern Rebuilding
From 50 CFM to 3500 CFM

AMERICAN AIR COMPRESSOR CORP.
Bell Ave. & 48th St., North Bergen, N. J.

FOR SALE

4—950 HP DIESEL ENGINES
2 CYCLE AIR INJECTION
WITH
4—700 KW 220 VOLT D.C. GENERATORS

IF INTERESTED IN ANY PART OF THE ABOVE, CONTACT

SOUTHERN SCRAP MATERIAL COMPANY
BOX 381, NEW ORLEANS, LOUISIANA

BOILERS

8-400 H.P. B & W Sterling Type water tube boilers A.S.M.E Code 200# pressure, with stokers and pulverizing equipment. Boilers can be shipped in one piece.
1-800 H.P. B & W Sterling Type water tube, Code 250# pressure, with Green forced draft chain grates, soot blowers, super heater.
1-2750 H.P. Badenhausen water tube, Code, 350# pressure. Air preheater, economizers, Attrition mills, super heater.
2-500 H.P. Edgemoor W.T. 200# press. chain grates, super heater, soot blowers. Can be shipped in one piece.
2-200 H.P. Keeler W.T. 160# pressure. Scotch, H.R.T. and fire box, types

ROBT. W. LYSLE & CO.
327 So. La Salle St., Chicago
Tel. Harrison 5569

D C SERIES MOTORS

21 HP	220 V	370 RPM	G.E.
54 HP	220 V	550 RPM	West K 10
80 HP	220 V	490 RPM	MD 106
100 HP	220 V	Northern type G.E.	

Crane controllers in stock

GOODMAN ELECTRIC MACHINERY CO.
1060 Broad St. Newark, N. J.

We Buy, Sell, Rebuild
Construct & Reconstruct
OVERHEAD TRAVELING CRANES
and
MACHINE TOOLS

L. M. GILBERT COMPANY
516 Drexel Bldg.
Philadelphia, Pa.

MACHINES FOR YOUR YARD

20 ton stiff leg derrick
Link Belt car puller, elec.
Northern OEC crane, 5 ton, 40 ft. span
Link Belt crawler crane, 12 ton capacity
Several 18 & 24 in. belt conveyors
Industrial locomotives, 4 to 20 ton

TRACTOR & EQUIPMENT CO.
3515 W. 51st ST. CHICAGO

FOR SALE
Re-used structurals & plates

20—tons of 2" Black Pipe Threaded & Coupled
1—7½ ton Traveling Gantry Crane. American Crane Company, Friendship, N. Y.
1—Schramm Double Drum Gas Hoist, 25 H.P. 3000 lb. Pull 150 ft. minute

FRITZ STEEL CORPORATION
540 Barry Street Bronx, N. Y.

6—95-ton American Locomotives Switchers 0-6-0
18-ton Manitowoc with 90 ft. boom
40-ton Capacity Browning Locomotive Crane
22-ton Capacity Link Belt Locomotive Crane
22-ton Capacity McMyler Locomotive Crane

"STONE, *the Crane Man*"
502 Insurance Exchange Building, Detroit, Mich.

IRON & STEEL PRODUCTS, INC., OFFERS:

(Request our Machinery & Equipment Bulletin)

CRANES, Locomotive
18 ton O. & S., 8 wheel, 50' boom
20 ton Industrial, 8-wheel, 50' boom
20 ton Link Belt, 8-wheel, 50' boom
22 ton Link Belt, 8-wheel, 50' boom
25 ton Browning, 8-wheel, 50' boom

WRECKING CRANE
75 ton Industrial with 35 ton 55' boom. Recently Rebuilt

CRANES, Overhead
5 ton Shaw, 55'6" span
7½ ton Alfred Box, 60' span, 3 motor
75 ton Case, 3 motor, 550 V D.C., 65' span
5 ton Wellman-Seaver Open Hearth Charging Machine "Low Type"

STEEL BUILDINGS
50'x180' with 10 ton Whiting Crane
77'x350' with leanto and craneway

OUTDOOR CRANEWAY
320' long with 10 ton Whiting 4 motor 220 V D.C., 80' span overhead crane

HOISTS
Superior Iron Works, single drum, 36" dia. with 80 H.P. G.E. Type MTC motor
1 ton single motor monorail type Hoists

BOILERS
60" dia. x 8'3" high, ASME 170#
Johnstown Bros. Loco. Type Boiler, 125# W.P., with injector & piping, etc.
2, 300 H.P. Water Tube Boilers
1, 394 H.P. 160# Stirling W.T. Boiler
1, 453 H.P. 160# Stirling W.T. Boiler
1, 500 H.P. 150# Scotch Marine Boiler, twin fire boxes
POWER PLANT with two 300 H.P. Boilers complete with two 500 KW, 3/60/2300 Turbines and Generators

COMPRESSORS
327 H.P. C.F.M. I-R 2-stage Imperial Type 10
1750 C.F.M. I-R with 300 H.P. motor
1050 C.F.M. Chi. Pneu. Type OCB with 150 A.C. motor

BLAST FURNACE REVOLVING DISTRIBUTOR with 10 H.P. 230 V motor

BUCKETS
2, 1½-yd. Brownhoist Clamshell Ore
1, 2-yd. Hayworth Clamshell
1, 2-yd. Orange Peel
2, 3-yd. Hulett Ore
1, ¾-yd. Hendrix Dragline
1, 3-yd. Power Wheel Clamshell
1, 5-yd. Hayworth Clamshell

BORING MILL
48" Pond Carwheel, 5-jaw chuck table, Davis Boring Bar

CARS, freight and industrial (all types & capacities)

CAR REPAIR PARTS: Freight—Largest dealers in them. (Request our stock lists)

LATHE, 36" Niles, center drive for truing RR Wheels mounted on axles

LOCOMOTIVES
60 ton American 6-wheel switcher
8 ton Vulcan, gasoline-operated

PIPE THREADING MACHINES
2" Bignall & Keller
6" Oster
6" Williams

PUMP
600 GPM Dayton with elec. motor
OTHER SIZES, TOO ! ! !

ROTARY KILN
6'6"x100'

SANDSLINGER
Beardsley & Piper "S"

SHEARS
#2 Canton
#3 Ryerson Lennox Bevel, 1" cap.
#7 Lever (Alligator Type) left hand cap. 6½" sq. or 4" x 24" soft cold steel
#7 United Eng. & Fdry. Alligator Shear

6½-yd. Bucyrus Erie Electric Stripping Shovel, 320-B

UNDERGROUND MINE SHOVEL
Goodman
Type 48. (Will sell for Parts)

TANKS, Storage—All Capacities! ! !
Our tanks are expertly rebuilt, thoroughly steamed, cleaned, hydrostatically tested under pressure

UPSETTING & FORGING MACHINES
2" to 4" capacity

WHEEL PRESS
150 ton Caldwell, 48" between bars, with motor

ELECTRICAL EQUIPMENT

GENERATORS
3½ KW Fairbanks Morse Generator, Type CP 2000 2000 RPM, 20 amps, Frame 5
150 KW West. 3/60/220 A.C. to 250 V D.C., M.G.
200 KW West. #201 SK comp. wound, 600 V D.C. with 200 H.P. syn. motor, 3/60/2200-900 RPM
500 KW G.E. Turbo Generator, 3/60/2300-3600 RPM with jet condenser, complete with two 300 H.P. Heine Marine Water Tube Boilers
1000 KW G.E. Type ATR-2-1250-3600, Form T, 814 amps 3/60/2200-900 RPM
5000 KW Turbo & Generator, 3/60/2300

ELECTRIC MOTORS
25 Units 10 to 75 H.P. squirrel cage, 3/60/440 A.C.
20 Units 3 to 50 H.P., 230 V D.C.

We also have on hand miscellaneous electrical items such as Oil Switches, Oil Circuit Breakers, Lighting Generators and Compensators.
WRITE FOR OUR ELECTRICAL LIST! ! !

WANTED!!!
MACHINERY & EQUIPMENT OF ALL TYPES
Fellow dealers' business appreciated

IRON & STEEL PRODUCTS, INC.

13496 S. Brainard Ave. — **Chicago, Illinois**

"Anything containing IRON or STEEL" — **38 YEARS' EXPERIENCE**

OVERHEAD ELECTRIC TRAVELING CRANES FOR SALE

3 TON CANCO 47' span, D.C., 3 motors, cab operated.
5 TON NORTHERN, 47½ ft. span, 3 motors, fish belly type, cab operated, D.C.
3 TON NORTHERN, 23 ft. span, one motor, A.C.
10 TON BROWNING, 36 ft. 4 in. span, 3 motors, A.C., 220 V, cab operated, fish belly type.
5 TON O.E.T., 47' span, D.C., 3 motors, cab operated.

TRI-MACHINE & TOOL CO., LTD.
248 Lafayette St., New York City

Overhead Electric Cranes
Traveling Gantries (Bucket Handling)
Traveling Portable Gantries
Overhead Electric Bucket Cranes
Electric Monorail Hoists
Air Compressors
Foundry & Steel Mill Equipment

WE OPERATE THE LARGEST PLANT IN THE COUNTRY EXCLUSIVELY REBUILDING THE ABOVE TYPES OF EQUIPMENT

T. B. MacCABE CO.

4302 Clarissa St.
Philadelphia, Pa.

OVERHEAD CRANES, TROLLEYS & RUNWAYS
1—30-ton Sellers 80'0" span, 2—15-ton trolleys, 230 volts D.C.
1—30-ton Morgan, 30'0" span, 5-ton auxiliary, 550 volts, D.C.
1—12½-ton Morgan, 58'6" span, 3-motor, 230 volts D.C.
1—10-ton Whiting, span to suit, 3-motor, 550 volts D.C.
1—10-ton Whiting, 4-motor bucket crane, 80'0" span, mill type motors, 230 volts D.C.
1—5-ton Champion, 37'6" span, 3-motor, 550 volts, 3 ph. 60 cy.

TROLLEYS
1—30-ton Morgan, 2-motor, 220 volts D.C.
1—10-ton Cleveland, 2-motor, 220 volts, 3 ph. 60 cy.

OUTSIDE RUNWAYS
1—Runway consisting of 21 bays at 16-ft. Total length 336-ft. 40-ft. high. A-frame type.

GAS PRODUCER
1—10-ft. dia. Producer, continuous type, continuous ash remover.

JAMES P. ARMEL - 925 FULTON BLDG. PITTSBURGH, PA.

LOCOMOTIVE CRANES

Browning Model #8 Capacity 25-ton (Just repaired at Browning shops)
2—50-ton Twin Hopper Cars
1—40-ton Flat Car

"STONE THE CRANE MAN"
502 Insurance Exchange Bldg., Detroit, Michigan

CRANES and HOISTS

No.	Make	Tons	Span	Motors'	Control
1	Shepard	1	Monorail Hoist	2-440-3-60AC	Floor
2	Shep. A	2½	9' Radi.	1-220-3-60AC	Floor
	Jib B	4	14' Radi.	1-220-3-60AC	Floor
1	Shepard	2	Hoist	3-220 V.D.C.	Cab
with Transfer bridge trucks					
1	Shepard	3	Hoist	2-220 V.D.C.	Cab
with 227' Monorail Runway with MG Set available					
1	Roeper	3	33'	3-220-2-60AC	Cab
1	Lane	5or10	50'	2-550-3-60AC	Cab
1	Shaw Box	15	33'	3-220 V.D.C.	Cab
2	Cleveland	5	80'	5-220 V.D.C.	Gantrys
1	Maris	30	20'	All Hand	Floor
with Steel Runway to Serve R.R. and Truck Terminal					
1	Morgan	50	150' Gantry	5-220 V.D.C.	Cab
1	Revolving Gantry	50	54' Radius, Portal	4-220 V.D.C.	Cab
1	Revolving Gantry	60	69' Radius, Portal	4-440 V.A.C.	Cab

82 HP & 25 HP, G.E. I.T.C. Crane Motors and Controllers, 440-3-60 A.C.
1 Pair 25 ton Box Section Fish Belly Crane Girders

SEND SPECIFICATION OF CRANE NEEDS

N. B. PAYNE & CO., INC.
105 West 55th St. New York City
Phone: Circle 7-6730

FOR SALE:

ALLOY ("CRITICAL") SCRAP

TURNINGS: $9.00 G.T. Houston plus payable OPA Nickel or Moly. Premiums

15 C/L SAE 3100; WPB #6
5 C/L SAE 4800; WPB #6
12 C/L Moly.-Mn.; WPB #7

TURNINGS: $12.91 G.T. Tracks, Chicago, plus payable OPA Nickel Premium

15 C/L 1-3.75% Nickel; WPB #6

FLASHINGS & CROPS: $16.50 G.T. Houston plus payable OPA Nickel or Moly. Premiums

6 C/L SAE 3100; WPB #6
3 C/L SAE 4800; WPB #6
6 C/L Moly.-Mn.; WPB #7

NOTE: Relative quantities of Turnings must be purchased with Flashings and Crops.

IRON & STEEL PRODUCTS, INC.
13496 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

HOT ROLLED BARS

ROUNDS

TONS	SIZE		QUALITY
15	1/4"	x 16'	1015
20	5/16"	x 16-20'	1015
25	3/8"	x 16'	1015
31	1/2"	x 18'	15/25
2	5/8"	x 16-20'	15/25
6	3/4"	x 16-20'	15/25
3	3/4"	x 31'	X1020
1	25/32"	x 6-14'	35/45
4	7/8"	x 18-20'	15/25
1	29/32"	x 5-14'	35/45
6	1"	x 20"	15/25
1	1 1/32"	x 7-14'	35/45
2	1 1/16"	x 32-37'	X1015
2	1 1/16"	x 15-37'	X1112
3	1 3/16"	x 11-34'	X1315
1	1 3/16"	x 33-34'	X1015
9	1 1/4"	x 18-20'	15/25
2	1 5/16"	x 14-36'	X1315
2	1 5/16"	x 18-32'	15/25
6	1 7/16"	x 13-34'	X1315
2	1 1/2"	x 33'9"	10/20
1	1 17/32"	x 30-35'	X1315
6	1 9/16"	x 32-34'	X1315
3	1 9/16"	x 12-34'	15/25
1	1 9/16"	x 33-34'	X1112
2	1 9/16"	x 12-37'	X1015
8	1 9/16"	x 37-39'	X1335
5	1 5/8"	x 33-34'	X1314
4	1 5/8"	x 20-21'	X1015
2	1 11/16"	x 33-34'	15/25
20	1 3/4"	x 18-20'	B1008
20	1 7/8"	x 18-20'	B1008
1	2 1/16"	x 12-20'	X1314
1	2 1/4"	x 12-16'	15/25
3	2 1/4"	x 17'7"	B1112
3	2 5/16"	x 22-24'	1115
1/2	2 5/16"	x 19-20'	X1314
8	2 1/2"	x 23-35'	X1315
20	2 3/4"	x 18-20'	B1008
1	2 13/16"	x 20-22'	X1315
20	4"	x 20-25'	30/40
3	4 1/2"	x 5-12'	15/25

Above items are available from warehouse stock for spot shipment

MIDLAND STEEL AND EQUIPMENT COMPANY
600 West Jackson Boulevard
Chicago, Illinois
Telephones: **Chesapeake 2662-3-4-5**

FOR SALE

STEEL BUILDINGS

1—215′ wide by 330′ long by 14′ high

1—80′ wide by 286′ long by 30′ high with crane runway heavy enough for 10 to 20 ton crane

1—50′ wide by 150′ long by 18′ high

1—40′ wide by 120′ long by 25′ high with crane runway heavy enough for 5 to 10 ton crane

1—109′ wide by 260′ long by 18′ high

If none of these buildings meet your requirements, let us know what you want as we have various other buildings, as well as *cranes* and *crane runways.*

Also Steel Tanks of All Kinds and Sizes.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair County, Ill.

We mean

MORE FOR YOUR DOLLAR

in

"*ANYTHING* containing IRON or STEEL"

TRY US WHEN OTHERS FAIL!

OUR "LINE"

CARS: freight Industrial, etc.
CAR REPAIR PARTS;
LOCOMOTIVES: any kind
PASSENGER-TRAIN CARS: any kind
RAILS, relaying. Any delivery
IRON & STEEL: Merchant
SURPLUS, OBSOLETE and REJECTED STOCKS: new or used.
BUILDINGS & STRUCTURES: steel
CRANES; ground, overhead and gantry. Also runways
POWER PLANT EQUIPMENT; boilers, generators, turbines, motors, etc.
EARTH HANDLING EQUIPMENT; mining, quarry, contractors', etc.
ABANDONED PLANTS, MACHINERY & EQUIPMENT
SCRAP-IRON; plain, nickel, tungsten, etc.

IRON & STEEL PRODUCTS, INC.
38 years' experience
13496 S. Brainard Ave., Chicago, Illinois
SELLERS BUYERS TRADERS

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300 TANKS 110 GAL. CAP.—BY OWNER

Storage or Refrigerator Car, 110 gal. cap., 18"x19"x72", 12 gauge Armco Iron, elect. welded, hot dipped galv. Open or closed top—leak proof. Write for blueprint and price.

DROMGOLD AND GLENN
332 S. Michigan Ave., Chicago, Illinois

BALL BEARINGS ROLLER
Many Sizes & Types — Large Stocks
PROMPT DELIVERY
Your Inquiries Solicited
Will purchase your surplus material
BEARINGS & MOTIVE SPECIALTIES CO.
29 Amsterdam Ave., New York, N. Y.

FOR SALE

STEEL BUILDINGS

40′x580′x22′ high
20′x40′, 20′x80′, 40′x120′
Complete—Excellent condition
SURPLUS STRUCTURAL STEEL CO.
TOLEDO, OHIO

IMMEDIATE DELIVERY!

CARS

20, Hopper, Double; 50-Ton.
17, Box; 36-0, 30-Ton.
24, Refrigerator, 36-0, 30-T; for industrial usage.
50, Refrigerator; 40-0, 40-Ton.
100, Flat; 40-0, 40-Ton.
50, Log Rack Flats; 40-Ton.
10, Dump; 24-Yd., 30-Ton; one-way dump; steel.
50, Dump; 12-Yd., 30-Ton; air; Western.
16, Tank; 10,000-Gal.
8, Tank; 8,000-Gal.
Locomotives & Pass. Cars also.

IRON & STEEL PRODUCTS, INC.
13496 S. Brainard Ave., Chicago, Illinios

CARS

SPECIAL 100—All Steel 50 TON Hoppers

35—40 ton steel u/f flats.
20—50 ton steel u/f flats.
15—30 ft. all-steel Gons. A1 condition.
200—30 ton steel u/f box cars.
25—50 ton all-steel Gons.
25—30 ton steel Gons., St. Ga. Blt. 1938.

LOCOMOTIVE CRANES
Saddle Tank Locomotives

RAILS

Complete Stocks at 90# 85# 75# 70# 65# 60# and lighter weights, with angle bars, carried at principal points throughout the country, available for rail or water shipment.

HYMAN-MICHAELS COMPANY
122 So. Michigan Ave. Chicago

RAILS and ACCESSORIES

RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.

NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.

Even though our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.
Every effort made to take care of emergency requirements.

Phone, Write, or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

RAIL - ACCESSORIES RAILWAY EQUIPMENT

• **BOUGHT** • **SOLD** •
WRITE WIRE PHONE

DULIEN STEEL PRODUCTS, INC.
414 First Ave., So. Seattle, Wash. — 2280 Woolworth Bldg. New York, N. Y.

RELAYING RAILS

16 lb. to 130 lb. New and Relaying Rails complete with angle bars. Spikes, bolts, tie plates, etc. Frog and switch material. All type cars and locomotives.

M. K. FRANK
480 Lexington Ave. New York City — 450 Fourth Ave. Pittsburgh, Pa.

FOR SALE

8,000 Pieces Used Galvanized Steel Pallets

12 Gauge Thick — 10" x 34"
Will send price and sample on inquiry

DULUTH IRON & METAL COMPANY
300 E. Michigan Street Duluth, Minnesota

PIPE

VALVES and FITTINGS
All Sizes in Stock
NEW—USED

GREENPOINT IRON & PIPE CO., INC.
Bogart, Stagg & Meadow Sts. Brooklyn, N.Y.

WANTED

1 Ten Ton Crane 40 ft. span to operate on 110 volts.

1 Plate Roll 12 ft. long. Capacity 3/4" plate full width with Drop End Housing.

1 Punch 72" Throat. Minimum Capacity 1 1/4" thru 1" Plate.

1 Gate Shear 8 ft. long. Capacity 1" Plate.

1 Quick Work Shear. 3/4" Plate Capacity.

1 Blue Valley Flanging Machine, 3/4" Capacity.

ADDRESS BOX V-589
Care *The Iron Age*, 100 E. 42nd St., New York

Cranes Compressors Cars
Shovels Locomotives Hoists

We are prepared to buy for cash Individual items or complete plants. What have you for Sale?

B. M. WEISS CO.

Girard Trust Co. Bldg. — Phila., Pa.

WANTED

Light Iron Material—Black or Galvanized—for our Logemann Presses for Coatesville or Lancaster Yard. We buy or recondition your rejected cars.

COATESVILLE SCRAP IRON & METAL CO.
Coatesville, Pa.

MACHINERY WANTED

Steam Drop Hammers, Trimming Presses, Die Making Equipment.

Must be in first class operating condition.

ADDRESS BOX V-597
Care *The Iron Age*, 100 E. 42nd St., New York

WANTED
(by Steel Company)

20 ton cap. Overhead Crane, D.C. 80' span —preferably with two 10 ton trolleys. Offer substitute if necessary as will alter to suit.

ADDRESS BOX V-590
Care *The Iron Age*, 100 E. 42nd St., New York

WANTED

Plate Bending Roll

10'-12' length
5/8" capacity

WINTER, WOLFF & CO.
76 Beaver Street
New York, N. Y.

WANTED
HYDRAULIC EXTRUSION PRESSES
1—500 to 1000-ton
1—2500-ton
1—4000 to 5000-ton

F. H. CRAWFORD & COMPANY, INC.
30 CHURCH ST. NEW YORK CITY

WANTED
STEEL BUILDINGS
WITH OR WITHOUT CRANE
RUNWAYS AND CRANES
STEEL TANKS OF ALL KINDS
PIPE AND TUBES
Can Make Immediate Inspection

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards (St. Clair Co.) Illinois

If you advertise in this section, your "Wants" will be quickly filled.

One Gang Slitter for cutting Cold Rolled Strip Steel in Coils.

Send complete description and picture with quotation. Priority furnished.

ADDRESS BOX V-601
Care *The Iron Age*, 100 E. 42nd St., New York

BUSINESS OPPORTUNITIES

ANOTHER PRODUCT WANTED

Long established and successful manufacturer of machinery is interested in adding to its line of products. If you have a product, machinery, machine tools, or specialties which you are having to neglect by reason of War contracts, but which has possibilities, we would like to hear from you with as complete information as possible. All replies will be held in confidence, and promptly acknowledged.

ADDRESS BOX V-588
Care *The Iron Age*, 100 E. 42nd St., New York

FOR SALE

STEEL FOUNDRY
WEST COAST

150 to 200 tons of finished castings monthly, medium size

Wire or Write To

FRANK B. FOSTER 829 OLIVER BLDG. PITTSBURGH, PA.

WANTED

Foundry, fully-equipped with one or more cupolas of at least 72 inch inside diameter. Prefer one with machine shop in connection. Please send full details for immediate action.

UNIVERSAL RESEARCH CORP.
2548 Elmwood Ave., Buffalo, N. Y.

WANTED

Patented machine to manufacture and sell after end of war. Must be medium weight or not over five tons assembled. Prefer cast iron as advertiser has large iron foundry as well as machine shop.

ADDRESS BOX V-520
Care *The Iron Age*, 100 E. 42nd St., New York

NEW INVENTIONS WANTED

Mechanical and electrical devices which can be used to promote our war production program. Either new ideas, or improvements upon present methods.

P. O. Box 217, Denville, N. J.

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

MANUFACTURING EXECUTIVES and TECHNICAL MEN

Qualified men wanted for openings throughout the United States. Write for application or submit experience record.
Inquiries solicited from responsible employers. All negotiations confidential. Est. 28 yrs.

HARRISON PERSONNEL SERVICE
20 W. JACKSON BLVD., CHICAGO

SALARIED POSITIONS — This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details. R. W. BIXBY, Inc., 274 Delward Bldg., Buffalo, N. Y.

REPRESENTATIVE WANTED

ESTABLISHED MANUFACTURER OF MACHINE UNITS

closely allied with industrial ball and roller bearings desires representation in valuable territories now open. Attractive commission arrangement in cooperation with distributors in these territories. Line has excellent reception in trade and deliveries are extremely prompt. The possibilities are unlimited in both war work and domestic production after the war. Write, giving full details, of previous activities.

ADDRESS BOX V-552
Care *The Iron Age,* 100 E. 42nd St., New York

AGENTS WANTED

If you are calling on Industrial Plants here is an opportunity to increase your income by selling wood factory stools. The demand for stools today is greater than ever before and our offer of immediate deliveries is what will get you the orders. Write stating lines you now carry and territory covered. Liberal Commissions. Agents wanted for all states. Those with established contacts will be given preference.

ADDRESS BOX V-603
Care *The Iron Age,* 100 E. 42nd St., New York

HELP WANTED

SMALL MANUFACTURER OF LIGHT EQUIPMENT desires research engineer to develop new products for the post war period. There is a permanent position in our western Pennsylvania plant for a man with mechanical and electrical experience. Applicant must be citizen, 38 to 50 years of age, and a graduate mechanical engineer. When replying, give education, experience, references, age and salary desired. Address Box V-558, care *The Iron Age,* 100 E. 42nd St., New York.

ENGINEERING EDITOR — Established industrial magazine has opening for engineering editor. Must have broad knowledge of metalworking, design and metallurgy, and ability to collect and present detailed data. Those now at full skill in war production not considered. Give complete record, including salary desired and marital status. Address Box V-581, care *The Iron Age,* 100 E. 42nd St., New York.

LAYEROUT—EXPERIENCED IN STRUCTURAL Steel—Tanks, Stacks, etc.—general steel work of all kinds. Must be A-1 mechanic. Steady work. 40 hr. week. Plant located in Perth Amboy, N. J. Address Box V-567, care *The Iron Age,* 100 E. 42nd St., New York.

HELP WANTED

FURNACE ENGINEER

Permanent position with long established and progressive Eastern manufacturer of heat treating furnaces. Applicant must have at least ten years of designing experience on medium-sized furnaces, be thoroughly familiar with standard furnace construction and capable of advanced designing for future operations.

Substantial salary to start with unlimited possibilities. For an interview at our expense, kindly furnish detailed experience and qualifications in writing.

ADDRESS BOX V-574
Care *The Iron Age,* 100 E. 42nd St., New York

General Manager

to take charge of precision aircraft parts plant and handle outside contacts, must have aircraft manufacturing experience, give full particulars in first letter which will be held strictly confidential.

Box #212,
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ENGINEER—MECHANICAL — Preferably with automotive experience, to assist in research and development work and as departmental consultant on mechanical problems. Small manufacturer, plenty chance for advancement. Now 100% war work, but planning for post-war production. Give complete history of your background in first letter, for consideration, also salary desired. Address Box V-586, care *The Iron Age,* 100 E. 42nd St., New York.

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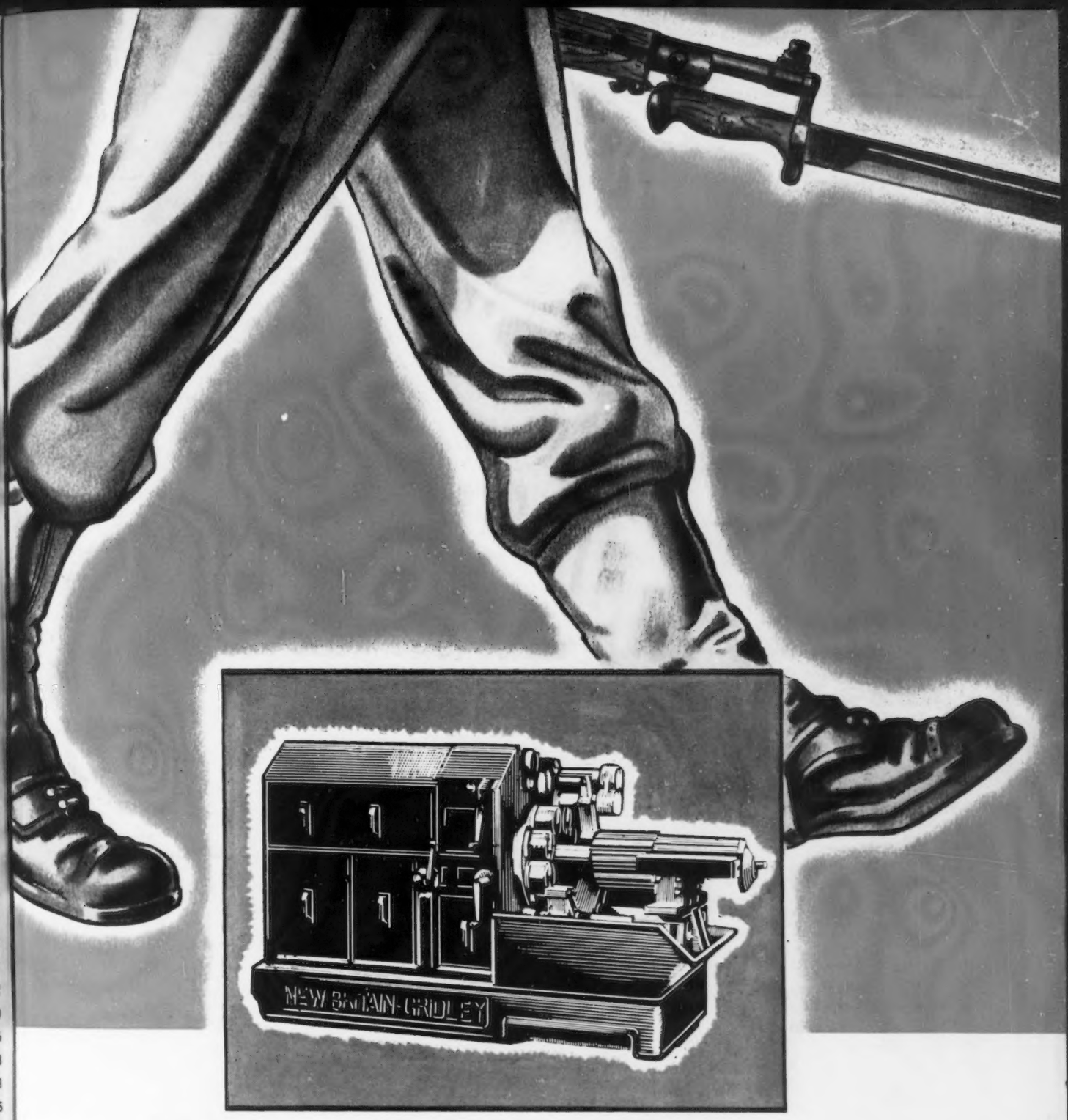

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